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STUDIES OF SYNCOPE

III. Differentiation Between Vasodepressor and Hysterical Fainting †

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In a recent communication, Alexander clearly and succinctly outlined certain points of differentiation between hysterical conversion and vegetative neurotic symptoms (1). It may be pertinent to quote directly his summary: "While the similarities are rather superficial both conditions are psychogenic, that is to say, they are caused ultimately by a chronic repressed or at least unrelieved emotional tension. The mechanisms involved, however, are fundamentally different, both psychodynamically and physiologically. The hysterical conversion symptom is an attempt to relieve an emotional tension in a symbolic way; it is a symbolic expression of a definite emotional content. This mechanism is restricted to the voluntary neuromuscular or sensory perceptive systems whose function is to express and relieve emotions. A vegetative neurosis consists of a psychogenic dysfunction of a vegetative organ which is not under control of the voluntary neuromuscular system. The vegetative symptom is not a substitute expression of the emotion, but its normal physiological concomitant."

We believe Alexander's concept of this differentiation is valid and useful. We believe, too, that the concept does not constitute a fixed bipolar typology. Obviously there are many instances in which unrelieved emotional tension may be accompanied by normal physiologic processes, but at the same time, tension may be relieved through symbolic means. Perhaps it would help to consider the possible range of human expression as it relates to this differentiation as a wide spectrum, the extremes of which illustrate clearly the differences between hysterical and vegetative phenomena but the midzones may comprise features of both. One has but to consider hysterical skin lesions or involvement of certain areas of the gastrointestinal tract (cardiospasm) to illustrate the complexity of the problem.

In certain instances, it is possible to differentiate clearly between the two types. In the following, we wish to present certain physiologic and psychologic data which we believe demonstrate the distinction between hysterical conversion and vegetative neurotic mechanisms as it relates to the problem of fainting.

Fainting, that is, syncope is a common and somewhat terrifying human experience. It is well known that syncope may occur secondary to certain structural and physiological derangements which ultimately lead to reduction of blood flow to the brain, and in some instances, to local disturbance of cerebral circulation. These include such physiologic derangements as loss of blood volume, as in hemorrhage; relative increase of the vascular bed, as in high fever; derangements in the posture regulating mechanisms of the autonomic nervous system, as in true orthostatic hypotension; cardiac standstill, as in Stokes-Adams attacks or reflex asystole from carotid sinus and other vagal afferents; and local cerebral mechanisms, as in the cerebral type of carotid sinus syncope.

However, syncope occurs more commonly in individuals who have no previously demonstrable structural or physiological disturbance, but who develop syncope abruptly under conditions of phantasied, consciously anticipated or actually experienced emotional stress. This includes the large group of people who faint during venepuncture, minor surgical procedures or injuries, upon witnessing mutilation or accidents, upon hearing tragic news or facing situations of threatening nature, and occasionally with no obvious precipitating or provocative stimulus. That psychological factors play an important role in such fainting has been known since antiquity, but less well appreciated is the fact that two quite different mechanisms may be involved in the loss of consciousness that climaxes these reactions. When these patients are studied during spontaneous or provoked syncope, one finds that they may be classified into two groups. In one group the loss of consciousness is preceded by rather striking clinical manifestations, including pallor, sweating, sighing respiration, hypotension and sometimes bradycardia. In the second group, consciousness is lost without any demonstrable changes in circulation or respiration. The clinical characteristics of the first group are those of vasodepressor syncope. The clinical characteristics of the second group we believe to be those of hysterical fainting. By a more complete description of the psychological and physiological characteristics of these two types of syncope as illustrated by detailed data on one

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representative case of each type, we hope to demonstrate the validity of the concept formulated by Alexander as it relates to fainting.

VASODEPRESSOR SYNCOPE

In previous communications, we have described the clinical and physiological characteristics of vasodepressor syncope (3, 5). Briefly, it was found that the reaction could be initiated by a great variety of noxious stimuli, such as venepuncture, injury to deep structures, distention of hollow organs, viewing mutilation, facing threatening situations, etc., but once initiated, the subsequent course of the reaction was unrelated to the nature of the provoking stimulus. Vasodepressor syncope is common upon initial exposure to a new and threatening situation. Nurses and medical students frequently faint anticipating or witnessing the first dissection, the first autopsy, or the first surgical operation. With repetitive experiences, these individuals have less and eventually no trouble. Clinically, the first symptoms and signs of vasodepressor syncope are weakness, followed quickly by sighing respiration, nausea, pallor, sweating, falling blood pressure, changes in cardiac rate and rhythm (tachycardia, bradycardia, and varying degrees of heart block), and finally, unconsciousness within 1-5 minutes if the subject remains in the erect position. The complete picture, culminating in unconsciousness, is likely to occur only in the erect position and most symptoms are relieved promptly upon returning to the recumbent position, although they may recur within a few minutes if the patient stands up too soon. The primary physiological change probably is an abrupt disturbance in the distribution of blood in the vascular bed. It is not known whether this is related to a decrease in venous or arteriolar tone, to a decrease in skeletal muscle tone, or to a shunting mechanism leading to pooling in splanchnic or other areas. In any case, the effect of gravity in the standing position greatly accentuates this disturbance, probably by impeding return of blood to the heart from dependent areas. The pallor and sighing respiration represent compensatory mechanisms designed to shunt blood from non-essential regions (skin and abdominal viscera) to aid filling of the heart. These signs, plus the sweating, nausea, air hunger, etc., are associated symptoms that occur during the phase of falling blood pressure. Unconsciousness does not result until arterial blood pressure or pulse pressure has fallen to extremely low levels, and then is accompanied by striking slowing of the brain waves. Recovery of consciousness and return of brain waves to normal occurs promptly upon resuming the recumbent position. Should the patient remain erect, the loss of consciousness is often followed within 10-20 seconds by clonic convulsive movements. Recovery of consciousness usually occurs within 20-40 seconds, with or without convulsive movements, even if the patient is maintained in the erect position.

The following case of typical vasodepressor syncope illustrates the concomitance of certain emotional experiences with these physiological changes.

The patient, J. B., a 40-year-old twice-married Kentucky farmer and unskilled laborer, who had been employed in a Cincinnati war material factory, came to the Out-Patient Clinic of the Cincinnati General Hospital in October, 1943, because of increasing disability due to pain in the chest, diffuse weakness and "spells" in which he lost consciousness. He remarked further that the symptoms, which had begun 4 to 5 months before, had prevented his return to work.

He was born on a small farm in Kentucky and had experienced little security in his relationships with parents or siblings, but found the kindness and interest of his maternal grandfather to be his chief support. This old gentleman, a preacher, taught him what he knew and impressed upon him the need for high ethical and social standards. During adolescence the patient broke away from his grandfather and from the religious beliefs, but was reconverted at the age of 19. He became deeply religious and succeeded in converting his entire family. The patient married shortly thereafter only to find his wife irreligious and irresponsible. She bore him a number of children. Although her slovenly and neglectful attitudes toward the home and children as well as her disrespectful attitude toward the church distressed him, he had no significant symptoms, somatic or otherwise, and had a fairly satisfactory work record. He remained deeply religious, was closely identified with his grandfather, the preacher, and, from time to time, assumed ministerial duties in the church. In spite of all this turmoil, he remained outwardly, at least, a fairly equable and easy-going person, who never was able to express his anger at anything or anybody.

Seven years before this report, his grandfather, while preaching a sermon, was suddenly seized with a severe chest pain, collapsed, and in a few minutes, died in the patient's presence. After this, the patient would occasionally complain of chest pain and weakness although neither symptom assumed any significant proportion. He usually experienced them during or after quarrels. Four years later, he divorced his wife, but the children, with the exception of the eldest son, remained in the wife's custody. Eight months later, he remarried and came to Cincinnati. He contracted gonorrhea soon after this marriage and concluded that his wife had been previously infected. She had borne no children and miscarried on one occasion. He worried constantly about his children, and insisted on visiting them frequently in spite of his former wife's objections. The visits often culminated in threats. In June, 1943, she brandished a gun and threatened his life if he returned. He had not been back since.

Another source of concern at that time was that his eldest son entered military service and suffered an injury to his leg which necessitated operative intervention. A

third factor consisted of an altercation which the patient had with a guard at the factory. The patient stated he had been asked to show his badge of identification six times within an hour. He felt he was being discriminated against, became resentful and angry but was unable to express it. Immediately after this he felt faint and experienced pain in his chest. This was his first fainting sensation. Following this, the symptoms of weakness, faintness and chest pain increased in frequency and severity. He fainted following the extraction of a tooth which took place under local anesthesia. He became restless, diffusely anxious and exhibited startle patterns to sudden noises. His dreams became repetitive and consisted of two major themes; one, of life in the good old days before he married the first time; the second, of frightening content, such as someone breaking into his room, airplanes bombing him, animals, such as bears or hippopotami chasing him. Usually he would be awakened, panicky, just before he was about to be injured or destroyed. Occasionally, he would dream of funerals and on one occasion, the dream consisted of his grandfather's funeral in which in the middle of the ceremony the old gentleman arose hale and hearty from his coffin.

He became extremely suspicious of his wife and believed that men were following her. He was distressed at her working in the same factory, and eventually insisted upon her quitting because she was forced to wear slacks.

During the initial physical examination, he became weak, pale and fainted while his blood pressure was determined. Following this, he fainted on two more occasions associated with venepuncture and attempt at dental nerve block.

The physical, neurologic and laboratory examinations revealed no significant abnormal findings. The following experiment was carried out:

The patient was brought to the laboratory, placed on a tilt table, and electroencephalographic and electrocardiographic electrodes applied. He was given little or no reassurance as to the objectives and possible hazards of this procedure. During 15 minutes resting quietly in the recumbent position, blood pressure ranged from 120/76 to 126/80 mm. Hg.; pulse, between 80-96 per minute, while the electroencephalogram (left and right fronto-occipital tracings) revealed a quite regular 9-10 per second alpha rhythm. The electrocardiogram (2nd lead) was normal. The patient was asked to hyperventilate vigorously for three minutes. Subjectively, he experienced heaviness in the chest, dizziness, and tingling of the hands and feet. The blood pressure dropped to 110/60 but then returned to its control value while the pulse rose to 144 per minute. During the last 20 seconds the electroencephalogram showed a considerable amount of high voltage 3-5 per second activity, and the patient had diminished awareness as evidenced by amnesia for certain test phrases administered during this period. Subjectively, this did not resemble the patient's spontaneous symptoms and constituted, in our experience, a normal reaction to 3 minutes' hyperventilation. After resting 10 minutes, the patient was tilted erect (75°). After 8 minutes in this position, the blood pressure was 112/82, pulse 114, the patient was slightly anxious and was experiencing slight pain over the left nipple. The electroencephalogram was unchanged. Stimulation of first the left and then the right carotid sinus produced no change in pulse or blood pressure and only some local pain. At the end of 15 minutes in the erect position, blood pressure was 120/86, pulse 114. He was questioned about the incident with the plant guard with no effect other than acceleration of pulse to 122 per minute. The patient was then told that he was to have a venepuncture. Within a minute after venepuncture the blood pressure began to fall and the patient experienced the progressive symptoms of weakness, sighing, sweating, pallor, and nausea, culminating within 3 minutes in unconsciousness and the appearance of high voltage slow waves on the electroencephalogram. Before collapse, blood pressure had fallen to 80/70 and bradycardia developed. The patient recovered consciousness and the electroencephalogram returned to normal promptly after being tilted back to the recumbent position, although relative hypotension (100/70) and bradycardia (66 per minute) persisted for 2 to 3 minutes.

The physiological data on this patient confirm in every detail those obtained in the previously reported patients with vasodepressor syncope (3, 5) as well as in other patients studied since then. In all instances, the reaction was characterized by progressive weakness, pallor, sighing, nausea, and finally falling blood pressure, culminating in unconsciousness if the patient remained erect. The loss of consciousness was always accompanied by a striking alteration in the electrical activity of the brain, with the development of high voltage 2-3 per second waves. If the patient were restored to the recumbent position before a critical fall in blood pressure had occurred, unconsciousness did not supervene and the electroencephalogram showed no significant changes. In short, the eventual loss of consciousness was the end result of a profound and acute alteration in circulatory dynamics.

The patient's personality structure, life experiences and behavior under experimental conditions lead to the conclusion that his fainting was determined principally by emotional factors. While we are unable to present in detail many important facets of his early life experiences, it appears that with the exception of a short-lived adolescent revolt, he identified with his grandfather, the patriarch preacher, and utilized successfully in his setting of multiple domestic discord, the

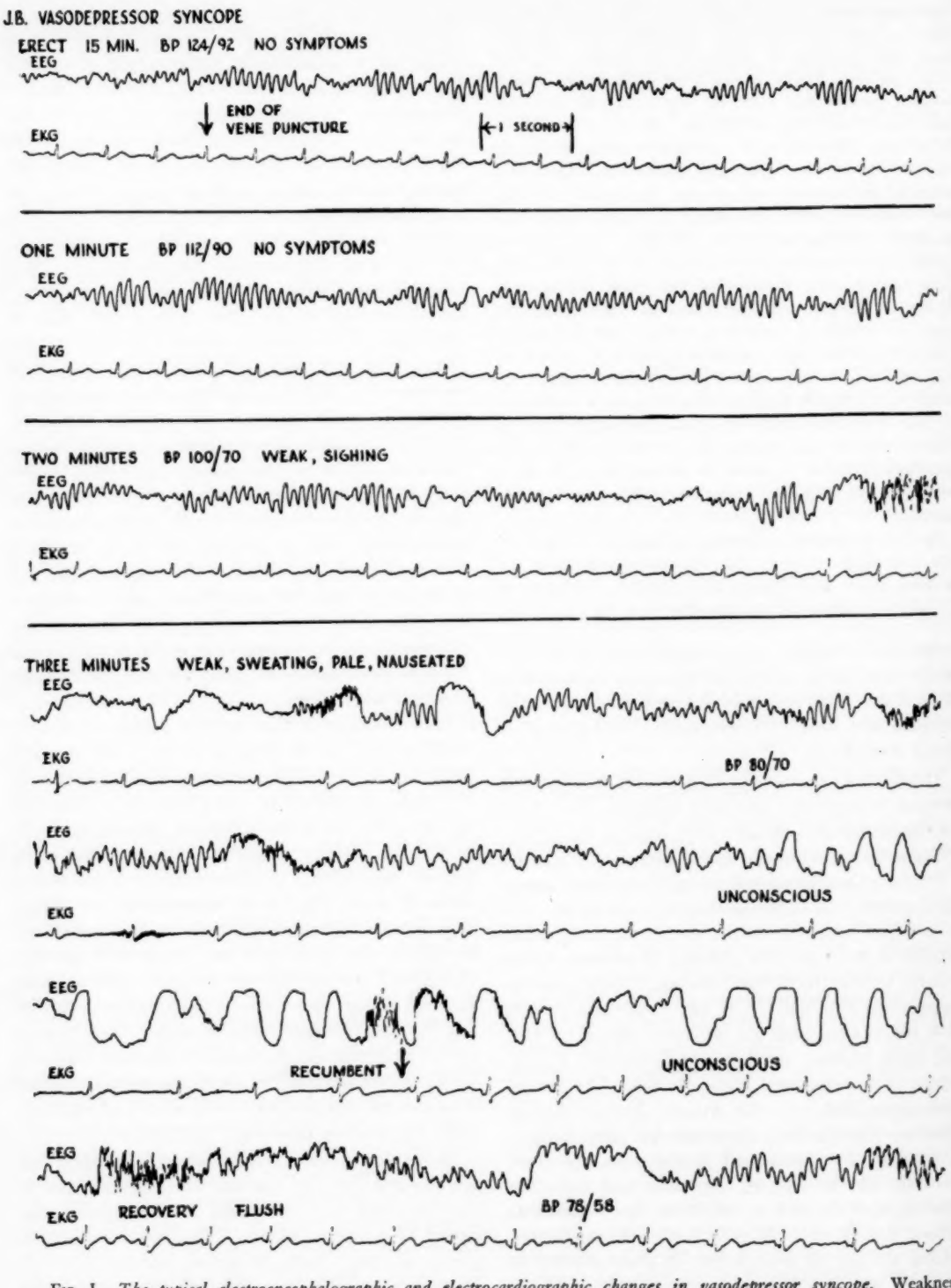

FIG. I. *The typical electroencephalographic and electrocardiographic changes in vasodepressor syncope.* Weakness, sighing, sweating, nausea and pallor occur during the phase of falling arterial blood pressure. No change in the electroencephalogram occurs until consciousness is lost and then the E.E.G. is characterized by high voltage waves of 2-3 per second frequency. With the return to the recumbent position and recovery of consciousness, the electroencephalogram returns promptly to normal.

defenses of passivity, submission and religious interests. These psychologic defenses remained more or less intact even after he witnessed the sudden death of his grandfather. However, the patient became aware of occasional chest pain and weakness which usually occurred following quarrels with his wife. Following the divorce and his second marriage, he began to experience chest symptoms more often. A number of factors probably contributed to his distress. These included (1) guilt over the second marriage, the venereal infection and the conflict with his religious beliefs; (2) grief resulting from the family separation, and (3) insecurity caused by the sudden transition from the small town to the big city. His anxiety neurosis reached formidable proportions after his wife threatened to shoot him, after he received news of his son's military disability and more particularly, after the incident with the plant guard in which he experienced impotent rage with great anxiety. In addition to the rather characteristic anxiety neurosis symptoms, he reacted to stimuli, even remotely interpretable as threatening or mutilating, with vasodepressor syncope, (blood pressure cuff, dental injection, venepuncture). The interpretations we offer for this behavior is that the vasodepressor syncope in this patient was the physiologic concomitant of the emotions of fear and anxiety, particularly in situations which mobilized his aggressive phantasies, which assumed proportions beyond which his ego could form no defenses other than flight.

Parenthetically, this flight reaction suggests that it might be possible to relate the human experience of vasodepressor syncope, particularly as it concerns muscular relaxation, to the sham death of defenseless animals.

HYSTERICAL SYNCOPE

In the second group of fainters, consciousness seems to be lost without any associated changes in general or cerebral circulation or in respiration. It is this group that we have called hysterical fainters.

Clinically, hysterical fainting differs from vasodepressor syncope in a number of respects. It tends to occur more frequently among women, although not exclusively so. The patients often exhibit other hysterical manifestations and often manifest little concern about their frequent faints ("la belle indifférence"). Fainting is more likely to occur in the presence of others. The loss of consciousness is usually abrupt and dramatic and is not preceded by the premonitory symptoms so characteristic of vasodepressor syncope. Although the patient falls or slumps to the ground, injury is infrequent. In contrast to vasodepressor syncope, pallor, sweating and changes in pulse and blood pressure do not occur, and consciousness is not regained upon attaining the recumbent position. The patient may remain unconscious for an indefinite period, ranging from a few seconds to hours. During the period of unconsciousness there are no changes in vital signs although there may be varying degrees of anesthesia and occasional random or tic-like movements. Recovery of consciousness may be subtle, but is complete.

The following case is reported in detail. Clinical and electroencephalographic studies on 4 additional cases will be included in a later report.

The second patient, C. S., a 25-year-old single woman was admitted to the hospital for study because of fainting spells which were occurring as often as 4 to 5 times daily. She had begun to experience these fainting spells three years before. At that time, she had struck her head on a table and is said to have lost consciousness. Initially, her spells would occur infrequently, usually once monthly during her menses, but they had increased in frequency, and at times she would remain unconscious for as long as 90 minutes. Usually in the presence of others, she would suddenly fall to the floor and, although there appeared to be no significant changes in pulse, blood pressure or color as observed by physicians, she remained limp and unresponsive. One was struck by her indifferent, exhibitionistic and childish attitude. She was characteristically vague as to the details of the onset, character and course of the disabling attacks. However, it was learned that she lived with her parents in a rural home, that she had worked for a period of time in a clinic and hospital, but at present remained home to nurse her invalid father. She reported in detail an incident in which her father became annoyed and struck her, causing her to faint. In recounting some of her symptoms associated with her faints she spoke of having frequent repetitive dreams of rather violent sexual experiences or in which she was in labor. This led to a description of her severe menstrual cramps which she had often thought to be as severe as labor pains. She had had a period of amenorrhea, nausea and abdominal distention at the time her sister-in-law was pregnant. She spoke constantly of pregnant women, of her love for babies, and when she worked in the hospital would take every opportunity to witness childbirth, Cesarian sections and surgical operations.

The usual physical and laboratory examinations elicited no significant findings. However, during the examination of the heart and lungs when the breasts were exposed, the patient became limp and unresponsive. When asked to stand at the bedside her legs were exposed in the move from the bed and with this she fell out of bed to the floor in a faint.

The following experiment was carried out. The patient was examined in the recumbent position on the tilt table. Blood pressure ranged from 108/80 to 110/76, and the pulse was 84. The electroencephalogram showed chiefly a low voltage fast pattern with

only a small amount of alpha (8-12 per second) activity and some 14-16 per second activity. Electrocardiogram was normal. The patient was tilted to the erect position (75°). There was an abrupt increase in heart rate to 138 per minute and blood pressure rose slightly (118/84). After 10 minutes of standing, blood pressure was 100/90 and pulse 138. She had no symptoms. The left carotid sinus was massaged. In 10 seconds the patient's head fell forward, and she did not respond. There was no change in pulse, blood pressure or color, and there was no sweating. The patient was unresponsive for 30 seconds, but there was no detectable change in the brain wave pattern. Upon recovery, she described the faint as identical with those which led her to seek medical attention. One minute later the left trapezius muscle was vigorously massaged. In 8 seconds the patient's head fell forward and she failed to respond to any stimulus for 55 seconds. Blood pressure during the syncope was 108/88 and pulse 144. Two minutes later the patient was asked to hyperventilate for 3 minutes. This resulted first in an increase in alpha activity and then in a moderate amount of higher voltage 4-7 per second activity but only slight tingling and light headedness. Thirty seconds after hyperventilation had been discontinued and the electroencephalographic pattern was returning to its original status, the patient again experienced syncope. She was unconscious for 80 seconds, during which time the electroencephalogram returned to and maintained its control pattern of dominant low voltage fast activity. Blood pressure was 108/92 and pulse was 138. Three minutes later, as the experiment was about to be discontinued, the patient spontaneously experienced syncope, lasting 2 minutes. The electroencephalogram again showed no changes during this period. Physiologically, although this patient exhibited mild postural maladaptation, the syncope was marked by the absence of any significant changes in pulse, blood pressure, color, sweating, etc. In spite of prolonged unconsciousness, the electroencephalogram showed no abnormalities and, in fact, on the occasion following hyperventilation became more normal. Similar absence of change in pulse, blood pressure, color, respiration, sweating, and in the electroencephalogram during varying periods of unconsciousness was noted in 4 additional patients with hysterical syncope and will be cited in detail in a later report. This is in striking contrast to the findings in all other forms of syncope in which unconsciousness is complete and lasts for more than a few seconds (5).

Aside from the characteristic presumptive and traditional clinical hysterical behavior of this young woman as well as the negative physiologic data, it may be of interest to consider her fainting from the points of view of "choice of neurotic symptom" and psychologic gains. Here again, because of our brief contact with the patient, we remain ignorant of many determinants. We are impressed, however, with the tenacity and intensity of her phantasies. Her dreams, directly or in disguised forms, were constituted of rape and violation, of pregnancy, labor, Cesarian births, and anesthesia. At the time of her sister-in-law's pregnancy, the patient's symptoms of nausea, amenorrhea and abdominal distention were undoubtedly identifications. Consciously the patient expressed constant interest in the welfare of pregnant women, in the care of infants, and during her hospital work as a technician arranged to witness surgical operations, childbirths and particularly Cesarian births. Her menstrual periods often were accompanied by cramps, severe enough for her to describe them as labor pains. Finally, she commented that frequently before fainting and at other times following recovery from the faint, she would remember details of dream fragments most of which were of a sexual nature. The total constellation of phantasies and consciously directed behavior of this patient are reminiscent of adolescent girls whose phantasies are full of pregnancy and birth ideas and of tendencies to identify themselves with pregnant women. As Helene Deutsch (2) has pointed out, if these phantasies are to a considerable extent accompanied by feelings of hatred and by aggressive impulses they result in morbid symptoms and fear of death. Further, she states that fainting during puberty expresses the girl's flight from dangers or her passive abandonment of herself to them. With our patient the role of the invalid father whom she nursed but who punished and struck her seems particularly significant. It seemed to us that the fainting experiences of this young woman were hysterical in nature. The fainting, itself, appeared to be the attempt at relief of sexual excitation. Her rape dreams, associated pseudocyesis and conscious interests in surgery, Cesarian birth and anesthesia comprise evidence that sexuality to her meant passive acceptance of violent mutilating attack. The fainting then appeared to serve as a substitutive or symbolic expression of the repressed sexuality. However, the fainting also served to reject the repressed emotion. Because of her fainting, she not only avoided sexual experience but she remained at home more or less a child, unable or unwilling to meet the demands of adult life.

In other words, this patient's fainting, an hysterical conversion symptom, existed as a substitutive expression—an abreaction—of the emotional tension of sexual excitation which could not find adequate outlet through full fledged motor behavior. As Freud, Alexander and others have pointed out, these substitutive and symbolic innervations never bring full relief. The

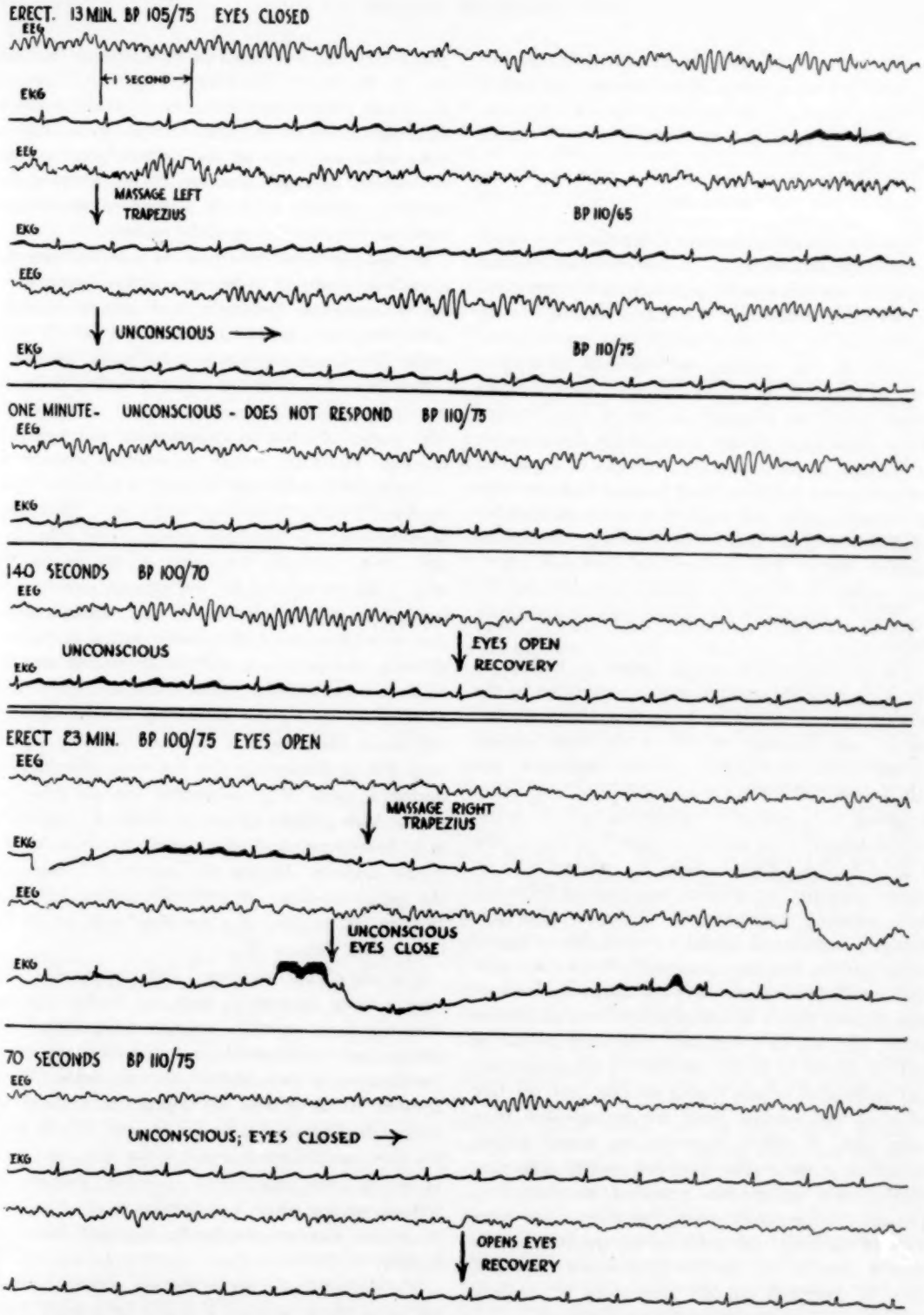

FIG. 2. *Typical electroencephalographic and electrocardiographic data in hysterical syncope.* With loss of consciousness following massage of the trapezius muscle, there were no changes in the electroencephalogram, electrocardiogram, pulses or blood pressure. Upon recovery of consciousness, the eyes were opened and alpha rhythm dropped out. The procedure was repeated with the patient's eyes open; with loss of consciousness the patient closed her eyes, and normal alpha rhythm appeared. With recovery of consciousness, eyes were opened and alpha rhythm again lost. The E.E.G. actually became more "normal" during the period of unconsciousness.

symptoms express at the same time both the repressed emotion and its rejection. It appears that our patient was able, through the repetitive hysterical syncope, to relieve partially the emotional tension of sexual excitation.

DISCUSSION

It is the principal purpose of this preliminary report to illustrate certain points of differentiation between hysterical conversion and vegetative neurotic symptoms as they relate to fainting. We believe that the fainting experienced by the first patient was vasodepressor syncope. In that instance, the emotional experiences were accompanied by certain changes in the circulatory system which led eventually to loss of consciousness. These physiologic changes were clearly demonstrable in the form of pallor, sweating, changes in respiration and pulse, and in falling blood pressure leading finally to cerebral anemia and marked distortion of the electrical activity of the brain. The physiologic mechanism suggests flight. The concomitant emotional experience appears to be that of anxiety overwhelming the ego and preventing other compromise compensatory defenses.

The fainting of the second patient as well as of the other hysterical patients, may be contrasted by the notable lack of change in respiration, circulatory dynamics and electrical activity of the brain during periods of unconsciousness. In our experience, unconsciousness related to changes in cortical metabolism is always accompanied by alterations in the electroencephalogram if the unconsciousness lasts longer than 1 to 2 seconds. This includes the cerebral type of carotid sinus syncope. Forster, Roseman and Gibbs (4) have reported on negative electroencephalographic data in patients stated to have a cerebral type of carotid sinus syncope. Our experience with 10 cases has been that slow E.E.G. waves always accompany unconsciousness of more than 1 to 2 seconds duration. In another report (2), we have criticized their data because of lack of control as to (a) duration of unconsciousness (b) position of patient during syncope, and (c) lack of proof that syncope could not be provoked from other sites. It will be noted in our second patient, as well as in the 4 other hysterical patients who were studied, that syncope was provoked not only from pressure on the carotid sinus, but from many other areas of the body. Obviously, if the specificity of the carotid sinus as the sensitive zone is not controlled, cases of hysterical syncope may easily be confused with the cerebral type of carotid sinus syncope.

The absence of any alteration of the electrical activity of the brain in these patients clearly distinguished the hysterical faint from fainting resulting from cerebral anemia due to general or local changes in blood flow to the brain. Essentially then, the fainting of the second patient was not due to concomitant physiologic phenomena of an emotional experience. Rather, from what we know of the patient's phantasy and the specific hysterical structure of the neurosis, the fainting appeared to be an attempt to express the repressed sexuality in a symbolic manner.

We do not intend to engage in polemics over the term "consciousness." Admittedly, it has a great number of meanings. Essentially, both patients, through contrasting mechanisms completely lost contact with reality, lost motor function, and fell to the ground.

Nor do we intend in this report to outline definitely the configurational personality structure or more specific conflict situation in vasodepressor and hysterical fainting. However, certain observations relevant to vasodepressor syncope may be made at this time. Vasodepressor syncope frequently occurs as a "first-time" phenomenon. The incidence appears to be dependent upon many variables, the nature of the person, the setting, the preparation for the noxious stimulus, the capacity to diffuse individual anxiety through identification with a group, the specific nature of the ego defenses used previously and the acuity and intensity of the noxious stimulus. Most first-time fainters learn or adapt in one manner or another so that repetitive experiences find them free from trouble. Recently we were able to demonstrate this fact more quantitatively during a study of vasodepressor syncope provoked during high altitude (35,000 to 38,000 ft.) exposures in a decompression chamber made by 78 male university students. During the course of 7 exposures the group incidence of syncopal reaction fell from 18% to 2% in spite of a sustained incidence of decompression sickness (3).

It is our clinical impression that vasodepressor syncope is more common in men and further that the men who have repetitive or neurotically determined syncope are characterized by considerable narcissistic consideration of their bodies. Any cut, bruise, injury, however trivial it may be, appears to mobilize an exaggerated degree of castration anxiety. Usually there has been considerable attention to the body, and pride in muscle mass and athletic endeavor. Perhaps the folklore opinion which is so familiar to all of us "that the bigger they are, the harder they fall" has some validity.

Our clinical studies are as yet not extensive enough for us to know whether it would be possible for a patient to experience both hysterical and vasodepressor syncope. From a theoretical consideration it would appear that the principal determinants would be the

nature of the personality structure and the nature of the noxious stimulus.

In conclusion, then, we wish to point out that the material presented leads us to believe that vasodepressor syncope is a vegetative neurotic symptom in which certain disturbances in circulatory dynamics occur concomitantly with emotions of fear and anxiety which overwhelm the ego and lead to a flight marked by weakness, falling, and loss of consciousness. In contrast, hysterical fainting appears to be the substitutive or symbolic expression of an emotion—an attempt at a partial relief of the chronic unrelieved emotional tension in which loss of consciousness is not related to any demonstrable disturbance in circulation or metabolism of the brain.

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Discussion

Chairman, Dr. Franz Alexander, Chicago, Ill.

The Chairman: I think this paper deserves a thorough discussion. Psychosomatic medicine is in danger of becoming the victim of a faulty generalization. It is always easier to make generalizations than precise distinctions. The generalization I mean is to call everything "conversion"; not only to call it but to try to explain every response of the organism to emotional stimuli or emotional situations, according to the early concept of Freud about hysterical conversion.

This tendency to generalize and explain everything, such as increased blood pressure in anger, increased flow of gastric juice under certain kinds of emotional stimuli, and all kinds of vegetative disturbances, as symbolic expressions of emotions went so far that even the Army at the induction centers lists all vegetative disturbances under the heading of "psychosomatic conversion." While working at the induction center, in every case I crossed out "psychosomatic conversion" where it should be crossed out, and put down instead "psychosomatic symptoms." When it is a real conversion, naturally I left in "conversion."

Of course, this is a rather hopeless battle against this so widespread misconception. Therefore, I am particularly interested in this paper which demonstrates so well the possibility and the significance of a precise distinction between hysterical conversion and vegetative neurosis. It shows that the latter is not an expressive phenomenon but a chronic disturbance of vegetative functions accompanying a chronic disturbance of the emotional equilibrium.

Dr. Richard Langendorf (Chicago, Ill.): I am not competent to discuss the very interesting interpretation of the different types of fainting given by Dr. Romano and Dr. Engel. I should like, however, to say a few words about the mechanism of non-hysterical syncope and the carotid sinus syndrome in particular.

In most instances of non-hysterical syncope there is a deficient blood flow from the heart to the brain, giving rise to unconsciousness. The defect may be primarily cardiac, the ventricles failing to transfer the incoming blood from the venous to the arterial side; or vascular, the return of blood to the heart being diminished. Cardiac syncope results when the ventricles cease beating for a period of 5 to 10 seconds, or beat very slowly (as slow as 20 to 8 per minute). It may also result when the ventricles beat very rapidly (over 250 beats per minute), or when they fibrillate.

In the vascular type, vaso-depressor syncope, or vaso-vagal syncope, as Thomas Lewis termed the most common type of fainting, two independent effects dominate: slowing of the heart due to increased vagal tone, and drop in arterial pressure secondary to vasodilation in the splanchnic area, both leading to cerebral ischemia.

Drop in blood pressure and ventricular slowing, or a combination of both are also the outstanding characteristics of two types of syncope due to hyperactive carotid sinus reflex. These are called the depressor type or the vagal type, depending on which predominates. A third type of carotid sinus syncope, the so-called cerebral type was described by Soma Weiss and his co-workers. This type is not accompanied by cardiac slowing or drop of arterial pressure, and is not caused by a change in cerebral blood flow. Whereas the vagal type responds to atropine medication, and both the vagal and depressor type can be successfully treated with adrenalin or ephedrine none of these drugs is effective in the cerebral type, for which surgical denervation of the carotid sinus is recommended.

Soma Weiss emphasized the important role in the hyperactive state of the carotid sinus reflex of the efferent end-organs as well as of the afferent end-organs. Thus, patients showing marked cardiac slowing were elderly persons, usually with some degree of coronary disease; patients who exhibit primarily a fall in blood pressure tend to show some degree of arterial hypertension. Finally, the patients with fainting spells without changes in the heart or peripheral vascular system were suffering from an unstable vasomotor system with psychologic responses of a neurotic.

It is obvious that syncope due to the cerebral type of carotid sinus syndrome, because of its lack of cardiovascular manifestations, is closer to hysterical fainting than any of the other types of syncope. It was interesting to learn that the electroencephalogram allows us to distinguish between the two.

Dr. Henry Richardson (New York, N. Y.): We have heard this morning of three kinds of fainting. I was interested in whether the one I have in mind is one of those three kinds or still another. Often you hear people talk about fainting in connection with anxiety symptoms, in which I include hyperventilation.

In the patients mentioned this morning, one type had rapid, shallow breathing and in the other, I believe, there was no hyperventilation. I have in mind a mechanism by which a person breathes beyond the physiological requirements and, as a result, has acapnia and the development of symptoms of tetany, with the physical signs of tetany.

I was interested in whether this type of fainting is among those discussed or whether it constitutes another type of fainting.

Dr. Louis N. Katz (Chicago, Ill.): The authors are to be congratulated on a superb presentation. I was impressed by their attempt at a quantitative approach.

There are two points I wish to make.

Some time ago, Dr. Miller and I wanted to check on the so-called cerebral form of fainting which had been described by Soma Weiss, Lennox and their collaborators. Three young women were picked who had a history of fainting. Carotid sinus pressure caused all three of the women to faint without change in heart rate or blood pressure. But pressure upon the sternocleidomastoid muscle gave an identical result. This has led me to wonder how often this "cerebral" form of carotid sinus reaction in which there are no cardiac or vasomotor disturbances, is simply a hysterical manifestation. I do not believe that the demonstration of a change in blood flow as measured by these investigators is sufficient to prove a localized decrease in cerebral flow, since they measured not only the flow to the brain but also the flow through the facial muscles and other parts of the head. However, the comment that there might be a disturbance in breathing leading to acapnia, and thus to fainting, maybe true in some of these patients.

My second point is this: I have seen a few cases of paroxysmal tachycardia, and one or two of reversible ventricular fibrillation, in which the attacks could be induced by an emotional upset. I remember, in particular, a young child who was considered to be an epileptic until it was shown that her convulsions and unconsciousness were cardiac in origin, developing during paroxysmal tachycardia. This little girl had very frequent attacks. While we were studying her, she became "conditioned" to the presence of the electrocardiograph and she would often develop an attack when the machine was brought in. In one of these she died. Fortunately, the fatal attack was not precipitated by the presence of the electrocardiograph in her room. I wonder what interpretation a psychiatrist would give in such a circumstance. Here is a girl with what we would consider an organic or, if not organic, surely a physiologic disturbance, and yet she had a very large emotional factor associated with it. Which came first? Which came second? How did they interrelate in this vicious mechanism?

Dr. Milton Rosenbaum (Cincinnati, Ohio): There is one point I should like to make which was partially brought out by the two previous discussants. That is the question of hyperventilation as it pertains to fainting and especially to convulsive seizures.

When I was a house officer at the Boston City Hospital, the group was very much interested in epilepsy. We were more or less taught that one could produce spells in patients who were susceptible to spells, by having them hyperventilate.

At that time this seemed to be confirmed by the electroencephalogram, with slowing of the brain waves produced by hyperventilation.

For some time after that, every time I saw a patient with grand-mal seizures, I would have them hyperventilate, but nothing would happen. Soon I discovered that the patients who developed either so-called seizures or some type of faint with hyperventilation were hysterical patients. All one has to do is to remember that most people who have attacks of hyperventilation are neurotic or anxious.

I think that Dr. Romano and Dr. Engel more or less touched on this in discussing Gibb's work in the cerebral type of carotid sinus fainting; that is, some of those patients may have had some type of hysterical faint.

I mention this because some people have failed to recognize the hysterical nature of many "seizures" produced by hyperventilation. Hyperventilation can precipitate petit-mal attacks in patients with either latent or clinical petit-mal epilepsy but I doubt very much that it plays a role in precipitating grand-mal attacks.

Dr. Warren S. McCulloch (Chicago, Ill.): I would like to ask two questions. First whether it has been possible to specify the psychological difference of those experiences which go over into the vagal type rather than into the sympathetic type of performance. One ordinarily thinks of outflow over the sympathetic rather than the parasympathetic nervous system in situations involving fear or anger.

The second question is this: the hysterical faint involves an unconsciousness which in some way may be essentially different from the unconsciousness in the vascular type. Has Dr. Romano as yet imagined in what place in the nervous system he would wish to put his electrodes to detect that alteration? I would not address this question to any one else than to Dr. Romano, because of the way in which he has already run down the picture in the case of migraine, where we had a disorder of which we were well aware but of which we had at that time no encephalographic record.

The Chairman: In conjunction with Dr. McCulloch's question, I would also like to ask Dr. Romano and Dr. Engel whether they tried and found any difference in the methods of bringing the subject out of hysterical faint in contrast to cerebral fainting. The popular remedy is to slap their face, or something like than;—a whole medical novel was written around this superstition; Cronin's "Citadel." Of course, in the case of a cerebral fainting, you won't expect this popular method to work.

I would like to know what their experience is in respect to terminating hysterical fainting by psychological methods.

Dr. Roy G. Hoskins (Boston, Mass.): I should like to ask one question regarding terminology. In both instances cited, the idea was expressed that the reactions represented "retreat." Also, it was suggested that in the first case we

were dealing with something comparable to the freezing reaction which is seen in certain wild animals in conditions of danger. The freezing reaction, biologically, is alternative to the retreat mechanism.

In the second case, it is obvious that the young lady was inviting sexual attention, and I should like to ask with what justification that could be regarded as a retreat.

Dr. Edward Weiss (Philadelphia, Pa.): This has been a very interesting presentation with wide implications, not only from the standpoint of fainting as such but in relation to the much more common symptoms of vertigo or lightheadedness that we hear so much about in the practice of general medicine. Such symptoms are frequently explained as circulatory in origin—either hypotensive or hypertensive. Quite regularly we hear from patients that they have been told by their physicians that their dizziness is due to "low blood pressure" or, as the case may be—"high blood pressure." Many clinical evidences of anxiety such as dizziness, "all gone" feelings in the abdomen, weakness and shakiness of the legs, occur in hysterical patients with normal or low blood pressure.

On the other hand, just recently I studied a patient with hypertension, who had cerebral circulatory phenomena, the psychological mechanism of which seemed to depend upon mutilation threats and the physiological mechanism appeared to be what is commonly described as hypertensive encephalopathy. This is a subject which needs much illumination in clinical medicine and I hopé the authors may include it in their study.

The concept of conversion hysteria versus vegatative neurosis is a very interesting one and I wish we had time to discuss this problem regarding the organ neuroses.

The Chairman: I am very glad to hear Dr. Weiss' suggestion to devote discussion to the further clarification of the concept of conversion and vegetative neuroses. However, I am afraid that this is a fundamental problem and we do not have the time that is required to clarify this issue at this time. May I say only that probably we will have to allow for mixed types, especially in the field of the skin. The skin is such a complicated organ with diversified functions: a sensory organ, a vegetative organ, and a protective organ. I do not see why we should not assume that both kinds of symptoms, those of the conversion type and also of the vegetative neurosis type may take place in the skin. The same is true for such an act as swallowing, or in defecation, urination, and so on, which are partially under the control of the voluntary nervous system and partially controlled by autonomic innervations. In these functions a combination of conversion symptoms with vegetative neurotic symptoms can be observed.

I don't think it will be possible in every case to determine precisely whether it is a hysterical conversion or vegetative neurosis because some conditions contain elements of both. However, it is important to know the difference between the two types of physiological mechanism.

Dr. John Romano (Cincinnati, Ohio): May I thank the discussants for their kindness and for their provocative questions.

First, in respect to Dr. Langendorf's résumé of some of the more pertinent physiological factors in fainting, I think the time may come soon when we will learn considerably more because of the introduction of certain methods for studying cardiac output more carefully. Recently, Stead and his co-workers in Atlanta, utilizing the Cournand technic of catheterization of the auricles, are contributing more data in respect to cardiac output.

In answer to Dr. Richardson's questions concerning the role of hyperventilation as a provocative factor in fainting, we discussed this problem in a previous communication in some detail. We have pointed out, first, that with hyperventilation there is a decrease in total cerebral blood flow, an increase in the oxygen uptake and, of course, a decrease in the partial pressure of carbon dioxide in the arterial blood. With most subjects who hyperventilate vigorously for a period of three minutes, there are demonstrable changes in the activity of the brain, as evidenced by the E.E.G., and also by disturbances in awareness. It may be that some of the disturbances which may resemble fainting are related to this disturbance of consciousness during hyperventilation.

A second factor is that of fright. We have noted in a great number of patients hyperventilating, with muscular effort and with the experience of becoming less aware, that the fright in itself may be a provocative factor and lead eventually to vasodepressor syncope.

A third factor is the cumulative effect of the decrease in blood pressure and of cerebral blood flow, with gravity. Usually when patients hyperventilate in the erect position when there is a tendency toward postural maladaptation, the hypotensive changes often seen during hyperventilation may precipitate syncope more rapidly.

Fourth, and most rarely, with the apnea in hyperventilation, there may be a reflex cardiac standstill, and fainting due to that. And, finally, as Dr. Rosenbaum pointed out, hyperventilation may provoke hysterical syncope. We have seen fainting with hyperventilation, and it may be due to one of the aforementioned factors.

In respect to hysterical hyperventilation, we also feel, that while it may be a manifestation of certain hysterical distress, it is also a very common physiological phenomenon which accompanies anxiety in many situations. We wish to point out, too, that it is of considerable clinical value in provoking petit mal seizures. Whether or not this phenomenon is actually related to the reduction of the partial pressure of carbon dioxide in the arterial blood, I don't know. Certainly, from the clinical point of view, it has been of value.

In answering the question of Dr. Katz' concerning the cerebral type of carotid sinus syncope, we would like to point out that Soma Weiss made it quite clear that he felt the cerebral type of carotid sinus syncope was a specific carotid sinus phenomenon, and that a disturbance of consciousness occurred without changes in pulse and blood pressure. In his data he checked other sources. In the patients he studied, he massaged the trapezius and the vertebra and other parts of the body and was unable to get unconsciousness except on pressure of the carotid sinus.

Moreover, we have been able to study a number of patients with the cerebral type of carotid syncope, as Dr. Engel mentioned. We believe there is such a phenomenon.

For example, one subject, a young physician who for

years had had symptoms of dizziness, light-headedness on turning his head sharply one way or, particularly, in backing out of a garage, was studied. When his left carotid sinus was massaged, he had slow waves on the left side of his brain and had right-sided symptoms of paresthesia and twitches. This was repeated on the opposite side, and the same phenomenon happened. He had no changes in pulse or blood pressure. Finally, when each artery was occluded, the symptoms were not manifest.

These data, together with other data we have accumulated, lead us to believe there is a cerebral type of carotid sinus syncope, though one must be sure of the points, namely, the specificity of the stimulus, the duration of the unconsciousness and the position of the patients.

Dr. Katz' remarks on paroxysmal tachycardia are of considerable interest. My own experience is somewhat limited in this field. It appears to me, any emotional stimulus, regardless of its magnitude, may provoke and bring about certain changes relating to anxiety and are reflected, of course, in the cardiovascular dynamics. Some of the work of Soma Weiss on sudden death and certain irreversible types of syncope, I think, are of particular interest in this regard.

Dr. Alexander asked the question about the nature of coming out of the faint, namely is that a diagnostic criterion. It may be. On the other hand, I think it may be of more value in the vasodepressor syncope because, after all, that is based on more valid, physiological data. In slapping a person, throwing cold water over their face, and so on, one is introducing other stimuli. As we know, in vasodepressor syncope, a certain amount of muscular activity, even before they get up, may be of considerable aid in combating the aftereffects of syncope and of avoiding the frequent recurrence of syncope.

Dr. Hoskins asked whether both types of syncope were retreat phenomena. If we left you with any dogmatic impression, we were in error. In the first patient, it is very difficult for us to state dogmatically that this is physiological flight. That is an extension of thinking for which it would be very difficult to produce evidence. All we can say is that, in our opinion, the first patient was presented with a series of noxious stimuli, which he was unable to react to in the usual compromise or defense mechanisms. Whether one says his ego was overwhelmed or not, I don't think matters very much. One has the feeling from the psychological point of view that he was unable to meet the situation adequately. Whether this is flight or withdrawal or something else, I don't know.

Physiologically, this may answer part of Dr. McCulloch's question, and this is something we have talked about before at similar meetings. We don't hold to any bipolarity in regard to sympathetic and parasympathetic. There are, of course, arithmetical means. In fact it is difficult to say more of or less of one or the other. In vasodepressor syncope, there is considerable activity of the sympathetic nervous system, namely, sweating and tachycardia which may precede the bradycardia. You have a picture of vagal defense or vagal flight, yet it incorporates and utilizes many sympathetic symptoms. In our opinion, the hysterical person was attempting to relieve partially some of the sexual excitation through the substitutive experience of the faint, the faint meaning to her the passive abandoment to being mutilated or being attacked sexually. On the other hand, the faint in itself, both in a primary and secondary sense, allowed her to reject the repressed emotion by not allowing any type of sexual behavior and, also, brought about in a secondary gain, a type of invalidism or regression by remaining at home with the father and the mother.

As to Dr. McCulloch's question, I don't know whether or not there is any point-to-point relationship with certain types of anxiety and fear in the sympathetic nervous system. I have often wondered, and I am sure you can answer, if Dr. Cannon had done his work on animals other than those he used, whether or not there would be as much attention paid to the bipolarity of symptoms. I wonder if there is in the human a striking utilization of the sympathetic nervous system in respect to certain reactions of fear that one sees in certain animals. We always see, clinically, arithmetical means and combinations of both sympathetic and parasympathetic systems.

When one deals with the gastro-intestinal tract in mucous colitis, one appears to deal usually with something that looks very much like the excitation of the parasympathetic nervous system. This seems to occur in situations which contain types of emotional feelings which are related to anxiety, if not fear.

The answer to Dr. McCulloch's second question as to where I would place the electrodes to find the center for hysterical fainting I will leave to the very end, if I may, and tell you a story.

Dr. Weiss' remarks are perfectly compatible with our experience. It is very common for many individuals who experience anxiety to have presyncopal symptoms which may vary in intensity and magnitude and character from time to time. Dizziness, as you know, is a term which is usually misinterpreted by the medical profession. It usually means vertigo to most physicians. If I remember correctly the original Anglo-Saxon derivation, dizziness meant "stupid" or "foolish." Usually patients use it not only to describe vertigo but also to describe light-headedness and giddiness which usually are presyncopal.

I certainly feel with Dr. Weiss and with Dr. Alexander the importance of the concept of differentiating between hysterical conversion symptoms and symptoms associated with vegetative neurotic symptoms. However, here too there are pitfalls associated with categorical bipolarity.

I feel, too, that the term "hysterical" is used very loosely. This leads to considerable confusion and, at times, to considerable resistance on the part of physiologists and physicians. I think it is appropriate for them to feel skeptical when one considers such an experience as rage, and then jumps directly to the histologic arterial changes in hypertension. One has to know the intermediate premises as they relate to concomitant physiologic changes with certain emotions.

In answer to Dr. McCulloch's second question, I am going to tell a story that was told recently by Dr. Selig Hecht, in a Sigma Xi lecture, on energy and vision. After this very interesting lecture, he answered a number of questions.

Finally one woman asked the question of Dr. Hecht as to what was light, and he said that, after all, he couldn't answer that directly, but he would tell a story. "A young woman was asked to go to a pet store to buy a canary. Her mother had warned her to get a male canary since they sing better. She explained this to the salesman. He said, 'That's right, they do sing better.' So he wrapped it up, or whatever one does with a canary, and gave it to her. As she walked away, she wondered, 'How can he tell a male canary from a female canary?' Her perplexity increased; finally she couldn't stand it and she went back and asked him. He said, 'That's easy. You see, a male canary eats male worms and a female canary eats female worms.' She said, 'Oh, that's it,' and walked away satisfied, for a while, but not too long. As she continued to walk away she again became perplexed and came back and said, 'Now, I understand the first part completely but the second question I would like to ask is, how can you tell male worms from female worms?'

He looked at her, his arms akimbo, and said, 'Look lady, this is a bird store.' "

So, Dr. McCulloch, I am unable to answer your question. I have no idea what the innervations are which produce the disturbances of consciousness, motor action and sensory modalities in the hysterical person. Nor have I any idea as to which physiologic method one would employ to determine such innervations.

PSYCHIC CONCOMITANTS IN WARTIME INJURIES *

HERBERT I. KUPPER, Passed Assistant Surgeon (R) †

The rehabilitation of men who have undergone combined organic and psychic injury will provide a grave problem following this war. An organic injury rarely occurs without concomitant psychologic effects. The interrelationship between the mind and the body has been the subject of much psychiatric research. Simmel (1) very succinctly expressed it in this manner: "The body is the instrument of the mind upon which it allows its unconscious to manifest itself in plastic and mimic expression."

A group of merchant seamen who had suffered head injury with unconsciousness entered the U. S. Marine Hospital, Ellis Island, N. Y., after a period of time ranging from six months to several years following trauma. The residual clinical pictures were puzzling and the referring physicians offered explanations ranging from irreversible brain damage to conscious simulation. In each case there was doubt expressed as to the explanation of the symptoms and there was uncertainty as to choice of therapeutic procedures. The symptoms which often accompany a concussion are generally regarded as organic in origin. Concussion is commonly interpreted as a jarring of the brain with loss of consciousness and some inevitable damage which purports to explain the post traumatic syndrome. Although this viewpoint has never been disproven, there is a tendency to disregard the ability of psychic mechanisms to encompass an individual who has ceased to be conscious.

In the described cases, the organism seemed to bind a greater measure of anxiety than was explainable on the basis of the organic injury sustained. Unconsciousness proved to be a psychologic as well as a pathologic response to trauma. The psychologic gain appeared to be a necessary and important reaction. The conscious ego [1] on its revival was equally as damaged and suffered as much disturbance as its more concrete partner, the brain. The damage to the latter seemed to have the ability to reach an equilibrium far more quickly than that to psychic mechanisms. The repressed anxiety showed a remarkable tendency to exaggerate and simulate far graver organic damage than the injury seemed to warrant. This change was much more resistant, and the remarkable way in which it combined with constitutional and organic factors often led to confusion in diagnosis.

The reason that one individual will develop a convulsive reaction following injury, while another will become amnestic, and a third show clinical signs of cerebral arteriosclerosis, such as dizziness, irritability and memory gaps is generally attributed to an unknown so-called constitutional factor. This unknown, in the light of our present knowledge seems to be immutable, but it is played upon, exaggerated, and stirred by psychic mechanisms. In two cases of middle aged seamen who had a moderate general arteriosclerosis, an injury produced a clinical picture of confusion found in advanced states of cerebral arteriosclerosis. Although we may conjecture the organic deterioration to be vastly speeded by the injury, the instant mimicry of a serious state and its partial reversibility must be attributed to other mechanisms. We know that diverse factors which

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[1] Ego is used in the psychoanalytic sense to mean an aspect of the personality which is partly conscious and unconscious and by which the individual relates himself to external realities.

constitute character and personality play a part. Psychic predispositions prior to the injury immediately crystallize into their unique primary and secondary gains. The almost automatic dependency and passivity needs of the individual are initially a protective factor which after a time become an integral part of the illness. These points are emphasized because of the increasing difficulty which attends the therapy of the equilibratory relationships between the organic and psychic equivalents in the injured individual. Kardiner's book on the chronicity of some war neuroses is interesting in this regard (5).

The methods of treatment included the brief psychotherapeutic means which expediency dictated. The expected results were a restitution of the individual to his pre-traumatic abilities allowing for residual brain changes. The pre-traumatic personalities remained somewhat assumptive, although comprehensive histories and continual case study served to describe their character. The preferred method of treatment was hypnotism when possible, used in conjunction with interpretive therapy. In spite of the somewhat overglowing reports of drug narcosis, it was found in these more chronic cases that emotional responses were not usually elicited. In addition, in our use of sodium amytal, emotional responses when elicited were not always recalled on awakening. The effectiveness of barbiturates themselves on the brain could not be proven with the use of sodium amytal in this hospital. With the preferred means above, it was possible to circumvent defenses by producing and interpreting dreams; also to reactivate repressed emotions and traumatic events which had reached a pathologic equilibrium, and then to realign this emotional discharge into a more suitable equilibrium. Small resistances were more conveniently overcome by daily psychotherapeutic sessions. Drugs were used when indicated, and served as an additional means of releasing repressed emotions.

The men discussed may possibly be lacking in morale and group ego. Reports indicate that collective spirit seems more apparent in such services as the Air Corps and the Navy. The patients under consideration found difficulty in group activities as well as in personal affairs throughout their lives. They consciously preferred the service chiefly because it offered increased monetary returns, and better positions for their lack of education. However, an advantage was the lack of impulsive neurotic behavior which often spurs men in war time and leads to equally grave mental downfalls. Their choice of the merchant marine was a voluntary one.

Definite neurological signs were rarely found. A supposition of brain injury was made when headache, dizziness, tinnitus, insomnia, faulty ocular convergence, diplopia, and fainting persisted after six or more months. Recent work by Grinker and Spiegel (4) on the war neuroses in North Africa emphasized the organic picture which overwhelming anxiety may simulate in men fighting at the front. When this initial anxiety had been dissipated, residual signs as described above were taken as evidence of brain damage in spite of the absence of focal findings. The individuals described below were not seen by the writer until many months following the injury. The early anxiety which accompanied the illness in these seamen was not usually observable, but the attempts of the individuals for a compromise equanimity were readily apparent. Brain damage was more or less fixed and the problem was one of reinforcing and then introducing the changed ego to the world. The only approach, after all attempts at organic repair were made, was obviously psychogenic.

Case 1: J. S. was a 24 year old maritime service trainee who was sent to this hospital in December, 1943, after a convulsive seizure with tonic and clonic movements was observed by the service physician at his base. He gave a history of similar attacks occurring each month, starting in 1938. They began two months after a concussion sustained during a football game. The peculiarity was that the attack occurred only in the mornings before breakfast. The patient believed with what proved to be extraordinary insight, that it was due to "too much sleep." Also there were unusual clonic movements of the body prior to the attack. These motions occurred every other day without loss of consciousness.

Family history was negative for "epilepsy" and associated illnesses. Past history indicated no apparent neurotic traits in the background except for immaturity and great dependency needs. Psychosexual history was not markedly abnormal. He was married but found difficulty in accepting his responsibilities. After the initial attacks in 1938, he visited the University of Pennsylvania in 1940 and a spinal tap, head x-rays, electroencephalogram and air encephalogram were done to determine the cause of his seizures. Except for diffuse abnormality on the electroencephalogram, indicative of convulsive disorder, nothing abnormal was found. A repetition of these tests with the exception of a ventriculogram was done here and diffuse cortical irregularities consistent with a convulsive disorder were found. In December, 1943, the patient was observed in an attack which embraced an aura of "floating" then unconsciousness, tonic and clonic movements. Tremendous physical activity followed and several men were needed to keep the patient from harming himself. The attack lasted 10 minutes and was followed by deep sleep.

The patient was successfully hypnotized but suggestion yielded no pertinent information. The patient was then told to spell any word or phrase which might be responsible for his attack. He spelled the word "hate" and was urged to dream of the people and circumstances relating to this. He then dreamed that his father was beating his mother and himself. He could not strike back because his arms were paralyzed in a similar manner to

his feeling prior to an attack. Repressed emotions were released through the use of "free association" and for the first time an accurate re-enactment of the first attack occurred. This happened in 1938 one morning before breakfast when sitting at the table with his father. The latter was quarreling with his wife because she favored the patient by giving him more buns. The father became physically and verbally threatening. The patient recalled great tension, looking at a knife on the table with a fantasy of stabbing his father and then ran into the kitchen to hold his mother in his arms. He felt faint and the last thought before he lost consciousness was that he would commit suicide by putting his head in the gas oven in the home of his maternal aunt. He awoke with his mother comforting him. He did not soil himself or bite his tongue.

This material is condensed and does not describe the persistent daily exposure of additional material and the overcoming of unconscious and conscious resistances. Thereafter, the patient was placed in an hypnotic state and serial electroencephalograms were taken. He was taken back to his twelfth birthday and the E.E.G. reading was within normal limits. It remained so through succeeding suggested years until his eighteenth year in 1938 following the first attack. Then diffuse cortical abnormalities occurred. By suggestion the patient was placed in the situation prior to the initial attack on the fateful morning. More irregularities, abnormalities and slight spiking occurred. The record was then changed within normal limits by reassuring the patient and the series repeated. *A convulsive seizure was produced and stopped while under hypnosis on suggestion of the examiner.* Moreover, this could not be produced except by bringing up the specific triangular situation. Persistent work done with interpretive therapy over three months made his hostility toward his father more acceptable. In addition, the attack was shown to be a punishment for this unacceptable death wish against the father as well as a fantasy of being "cleansed" and "reborn." The patient always described feeling "fresh as a daisy" following an attack. He related that although he feared them, he looked forward to the aftermath. The prodromal feeling of "floating" which occurred prior to a seizure was connected with his concept of suicide by gas as described in the initial attack. His almost daily clonic movements were traced to a morning in 1938. They started as he was sitting at the breakfast table with his father and when a hot cup of coffee was propelled at the father by the uncontrollable movements of his hands.

Repeated dreams were interpreted by the patient himself without suggestion. The ease with which the symbols were deciphered bears out well the findings of Farber and Fisher (1). Any threatening figure was interpreted as the father and most stationary ones as the mother. The content was invariably that of the father threatening the son and mother, while the son was "paralyzed" or powerless. The fear of "too much sleep" proved to be a fear of dreaming which always preceded an attack. In attempts to "resist" the patient would dream of a house filled with buns which everyone ate so that his father was appeased.

A Rorschach was done and there was no evidence of so-called "epileptic personality." Evidences of insight and change in character traits were recorded.

The patient was allowed to visit home on one occasion for a week, and in spite of repeated contact with his father suffered only tenseness. He has remained in close contact with his father without untoward effects.

The uniqueness of this case is in the fact that in spite of undeniable constitutional or organic factors, the emotional overflow and the psychogenic precipitating factors were modifiable. It would be too early to claim a cure but a remarkable improvement was undeniable. The patient has been working and free from seizure for four months.

This case report emphasizes that emotional and psychogenic factors precipitated an "epileptiform" attack; and more important, that there was an emotional threshold, which if not exceeded, could prevent a seizure. In this man, the trigger to a convulsive seizure centered about a personal conflict whose resolution could lower the emotional danger point enough for clinical improvement. Under hypnosis and in interviews, only this emotional problem could produce an attack or a perceptible change in the electroencephalogram. The broad generalization for epileptics to avoid "excitement," "upsets," and the like, is inadequate. Some particular unconscious conflict seems to be the one capable of producing a clinical change as evidenced by seizures in this patient. This can be the only explanation of how epileptics manage to undergo many daily environmental traumata and succumb to relatively few. Also noteworthy was the fact that unconsciousness offered the only solution for the intolerable conflict on the morning of the first attack.

Case 2: F. F. was a 23 year old seaman who was admitted in February, 1943. He was torpedoed in September, 1942 and sustained a severe head injury with unconsciousness lasting for 30 minutes. He suffered almost complete retrograde memory loss and occipital headaches. There was no skull fracture. He was rescued and was treated on a West Indian Island for several weeks. He improved and subsequently was sent home to the United States. A worried mother soon sent him to a nearby Marine Hospital because of mental dullness and confusion. The findings of this hospital demonstrated a marked intellectual impairment which did not correspond to his high school education. He was then transferred to the Ellis Island Marine Hospital.

Physical and neurological examinations showed no focal abnormalities. A spinal tap, x-rays, and air encephalogram showed nothing abnormal except for an increase in spinal fluid pressure to 230 mm. of water. The most remarkable features were a dull mien and amnesia for many past and present events. He could not do simple arithmetical problems, and appeared bewildered and somewhat silly in answering questions. A psychometric examination demonstrated low average intelligence with memory defects more prominent than intellectual impairment. A diagnosis of post-traumatic change was made and the prognosis was deemed to be poor. Attempts at hypnotism failed and

sodium amytal was given intravenously, because the apparently poor outlook in this case made any procedure worthy of a trial.

The leading suspicion of emotional overflow came from the disproportion between memory gap and intellectual ability. The former seemed more affected than the latter. The patient was given sodium amytal. The attempt surprisingly relieved a great deal of repressed anxiety. The patient recalled the torpedoing with great emotion. He was rendered unconscious for many minutes and observed on awakening that many of his shipmates were horribly mangled. He found that the submarine had arisen and threatened to sink a lifeboat he had managed to reach. He recalled a great religious exaltation in spite of throbbing headache and mental dullness at that moment. He described a wish to "evaporate" at that moment. Rescued a few days later, he was landed in South America. He denied memory loss or dullness then but stated that he, a rigidly reared boy, began to drink heavily and indulge promiscuously in sexual activities. He also suffered from occipital headache, diplopia, and faintness. He developed increasingly guilty feelings and a retrograde loss of memory occurred. He recalled a feeling of unreality so that when asked to solve a simple arithmetical problem or do simple calculation, his immediate association was of his schooldays, and the like, which in turn reawakened the guilt of his late "moral" downfall. Improvement was rapid and lasting. Except for headaches, faintness and diplopia he was improved enough to be discharged.

What seemed to be intellectual impairment was in reality an associative blocking phenomenon, from which he always found his conflict brought to the fore. The secondary gain became apparent to him. What he did not recall would not produce remorse. It also explained the discrepancies in formal intellectual testing. He could answer unrelated questions of world politics or the constituents of certain organic materials, but the "block" always occurred when psychologically traumatic emotions threatened to appear.

The obvious psychologic tactical aim was for the examiner to alleviate this strict conscience. Even this portion of the psyche zealously guarded its perogatives and the need for self-punishment persisted. Through repeated interviews and occasional psychotherapeutic sessions using narcosis he finally achieved considerable insight and reassurance. Persistent headache, faintness and diplopia continued.

For the past year this individual has been manager of a large farm. Letters from his mother tell of his success, with the exception of two periods of mild confusion. These have occurred twice for a period of several days after he first arrived home. They were featured by severe headache, diplopia and a feeling of "being lost" for a time. Details were lacking, but these periods have occurred during social occasions. He has remained symptom free for eight months following these episodes.

Case 3: J. F. was a 52 year old seaman who entered the hospital on December 31, 1943 from a seamen's rest camp. He had been torpedoed on July 5, 1943 and was in a confusional state. The patient was a middle-aged man with a flattened affect who could not answer questions promptly, but merely stared blankly at the interviewer. When he did respond, he was disoriented for day and year. He complained of dizziness, persistent headache even when asleep, deafness and ringing in the left ear and a numbness of the left face following the course of the trigeminal nerve. He stated in more lucid moments that he had 2 to 3 hour lapses of memory which included a loss of knowledge of his own identity. On observation he appeared confused and perplexed. He seemed to be deep in thought but was incapable of speaking. He would smile to himself in an aimless fashion from time to time. There did not appear to be any great anxiety or agitation. All formal testing of intelligence and orientation was met by blankness or increasing confusion.

Past history indicated that this man was a professional seaman who had been sailing for 35 years. He was regarded as a reliable man who did not drink excessively. When his illness started, he had a position of responsibility and was in charge of the younger crew members. There was no evidence of personality change or memory loss during the last few years or months. Friends and business acquaintances regarded him as a seclusive, but honest and intelligent individual. He had finished grade school.

Physical examination revealed moderate arteriosclerosis and a marked hypertension averaging 210/130. Neurological examination revealed nerve deafness in the left ear, irregularity of pupils, and a left hemi-hypesthesia including the face for vibration and pinprick. The diagnosis of the referring physician was cerebral arteriosclerosis with psychosis, and post-traumatic deterioration. Laboratory examinations showed normal skull x-rays, spinal tap, blood work, and electroencephalogram.

The swiftness of the change in this man's clinical picture proved so bizarre that psychogenic changes were suspected. Hypnosis was attempted with excellent results. With a great deal of emotion, he described the torpedoing and the blow to his head while in a lifeboat. He described his fear and apprehension when his lifeboat was shelled. He prepared for death, and at the time suffered headache, dizziness and amnesia. He piteously denied his fear of returning to sea or of having an "operation" although neither had been suggested. In addition, never absent, repressed "sins" and guilt over personal affairs played their part in creating functional overflow. He had an illegitimate daughter and feared exposure of his secret to her. Much additional guilt came to the surface.

On awakening from the hypnotic trance, the patient appeared much more alert and asked many questions about past events. He reacted like a man who had been asleep for six months and then attempted to connect the threads of his memory. The difficulty in hearing in the left ear which accounted for some perplexity when questioned, although improved, was still troublesome. When in an hypnotic trance he seemed to hear much better. Further information elicited in the trance brought out the fact that following his head injury, he had bled profusely from the nose and mouth. Repeated hypnotic sessions relieved anxiety to a great extent, and the individual became alert and

interested. He suffered severe headache and dizziness almost constantly. The blood pressure remained extraordinarily high. Since sedative drugs and vasodilators were ineffective, the patient was put in a trance and a simple explanation of the mechanics of his high blood pressure was given him. He was told that his tenseness caused heart irregularities and vessel constrictions. It was then suggested that his pressure would fall. Within five minutes the systolic pressure dropped 20 to 25 m.m. Further controls were attempted and the patient's pressure was taken standing and reclining for 15 minutes both before and after hypnosis. The headaches and dizziness were easily controlled in this manner. Invariably, this means of relieving his tension and pressure never lasted over two to three days. The results, however, were heartening and the procedure easily repeated.

The patient was found to have a partial nerve deafness in the left ear. The manner in which the patient's hearing varied in a trance and on some occasions, led the author to feel that further emotional overflow played a part. His hearing was tested during fair and poor weather by various physicians. The patient preoccupied with compensation claims which he feared might be denied him, invariably heard less with the interviewer than with anyone else. He was given an audiometer test and a complete loss of hearing was found in the left ear. Finally under as exactly similar conditions as possible, he was hypnotized and again sent for an audiometer reading after a simple explanation and suggestion was made concerning his hearing difficulty. This reading showed improvement in spite of undeniable organic injury to the auditory nerve.

This individual provided an unusual example of undisputed somatic difficulties with unconscious emotional involvement. The latter exaggerated the former to such an extent that irreparable and irreversible damage was assumed. The clarification of these component parts changed a nearly vegetative man into an individual who could live alone and function in New York City. Certainly the amount of psychic damage was equal and perhaps greater than the structural damage. In spite of seemingly conscious efforts to retain advantageous symptoms, it would be obviously unfair to label him a malingerer. The close approximation and interplay between his unconscious and reality factors were apparent. If we assume that his desire for compensation caused simulation, then we cannot deny that this feigning created anxiety with consequent higher blood pressure and increased loss of hearing. An exaggeration of any symptom due to head injury does not take place without a drain upon the unconscious economy. For this reason a diagnosis of malingering in a psychosomatic illness should rarely be made. To reduce compensation for the emotional overflow of an organic illness would be unfair. Around every organic sign there is protective psychogenic overflow which prevents more complete disintegration of the individual.

Case 4: W. N., a 54 year old merchant seaman, entered this hospital in July, 1943 from a rest center for seamen. A physician's notation stated that the patient was in a confused state for details of time and place, showed psychomotor retardation, was suspicious and preoccupied with the near and distant past rather than the future. Severe and constant headaches were complained of by the patient.

Physical examination showed a moderate general arteriosclerosis. Neurological examination showed no focal signs except for coarse tremors of the outstretched hands. Some tortuosity, silver wiring and nicking of the blood vessels in the fundi, were observed.

The patient had been sailing over dangerous sea lanes since the war began and noticed some memory defect and insomnia prior to his disastrous trip in April, 1942. This was a dangerous trip to Murmansk, Russia. Out of Iceland, his ship was attacked by torpedo planes for several days until a torpedo blew the ship up. The patient recalled hurling a teacup in rage at a diving plane before he was knocked unconscious for an indefinite period. He was rescued and the rescue ship was bombed for many days. He felt "confused" in thinking, showed memory loss, and had severe headaches. He suffered "startle reaction," tremors and classic signs of a "traumatic" neurosis. In Murmansk and Archangel, he was bombed daily and on the way back to England, several neighboring ships were torpedoed. He returned to the United States in a state of extreme anxiety and insomnia. He was so perplexed and helpless that he immediately boarded another ship. He had to be returned and was sent to a merchant seaman rest center as described above.

Family history was not significant, and past history showed no marked neuropathic traits except for a lifelong inability to remain in one place. This caused him to "ship out." He was always an immature, dependent person who made a minimal marital adjustment and was never content with his wife. He felt she favored his sons.

This backlog of mild confusion described by the referring physician as of "psychotic proportions," soon showed a tinge which suited his character. It seemed that all his periodic confusions were precipitated after contact with women. He was irritable, suffered from faintness, accused women in contact with him of neglecting him, preferring others, and other paranoid-like delusions.

Since violent psychic and organic trauma had precipitated a state resembling a borderline psychosis with cerebral arteriosclerosis, these changes were thought to be partially reversible. Hypnotic measures produced only a superficial sleep in this extremely anxious man, so that narcotic drugs were used with hypnosis. A moderate "abreaction" occurred with the marked feature of infantile regression most prominent. The patient who had always regarded his ship as the one permanent, never changing love object in his life, found the integrity of this relationship threatened. He recalled his utter panic. Although he knew of the hazards of "shipping out," he could never accept the concept of his ship, this part of his total ego boundaries as destructible. It was as if the foundation of his life were being undermined. He spoke profusely of his mother, of her being the only other constant, trustworthy feature in his life. Throughout his

adulthood he accepted money and favors from her. His shipping all his life seemed to be his unconscious search for a similar maternal arrangement. Additional interviews and laborious interpretive sessions for six months modified a great deal of damage in the patient. He underwent many stormy interpersonal relationships with nurses and social service workers within the hospital. He ultimately achieved insight into these relationships and improved sufficiently to be working in a responsible shore position for his company.

This patient demonstrates a professional seaman of an unusually steady type whose lifelong character patterns were disturbed. Infantile regression in the form of temper tantrums are common enough in all traumatic neuroses. However, the age of this individual, the length of time of his illness before improvement, seemed to point to an organically determined factor. His symptoms seemed to indicate cerebral arteriosclerosis. Even if the majority of his complaints and disabilities were proven to be psychogenic, the difficulty in diagnosis has been a common problem in the veteran seaman who has undergone severe damage during the last several years.

DISCUSSION

The above histories represented total personality changes due to combined organic and psychic injuries. Since every trauma produced both types of injury, attempts to clearly delineate how much of the damage was organic and how much psychic, was futile. As shown in each of the above cases, emotional factors have exaggerated the organic injury just as the latter has brought psychic elements into play. Time will not always cause the alleviation on the psychological effects but will rather help them crystallize into some type of equilibrium. This may create a permanent state unless the repressed emotions have been released and have been understood by the patient. An organic condition provided a stronger nucleus around which unconscious factors aggregate.

Whatever the damage to the organism, the clinical symptoms in an organic illness were colored by psychic elements. This has been true for mental changes due to cerebral arteriosclerotic as well as for "constitutional" defects. Two of the seamen described above were in their middle fifties and in spite of moderate arteriosclerotic changes, clinical symptoms were exaggerated by unconscious elements to resemble advanced cerebral arteriosclerotic confusion. Abnormal cortical rhythms shown by electroencephalograms in patients with convulsive disorders may be "hereditary" but the convulsive seizures with related E.E.G. changes in this instance were precipitated by psychic conflicts. Some anxiety was necessarily produced by trauma to an individual. When a threat or actual trauma has been enough to produce a state of unconsciousness, then the anxiety produced overwhelmed the patient. If this exceeded the limits of the ego to withstand possible dissolution, then protective abnormal mechanisms come into play. These were all the familiar changes seen in peacetime or wartime psychoneurotic illness, namely and foremost, repression of the emotions caused by the threatening events. This was seen in the patient with the convulsive seizure. Whenever this type of defense was insufficient to deal with the anxiety, conversion phenomena sought to harness and divert the attention of the harassed ego. Regression may continue in its protective function until a near vegetative state has been reached. If a severe conscience has been part of the character structure, then a depression with anxiety may provide punishment for the failure of the individual to live up to his ideal personality. The mechanism of projection and every other form of psychic self protection may be used.

The unique problem of a combined injury was that the trauma which caused an organic illness, became after a time a protective device for the integrity of the entire personality. A severe sense of guilt which may punish a patient, as in the individual who was sexually promiscuous, was soothed by the authenticated fact that a man has suffered "unconsciousness" and injury. The most common statements from all patients were, "I would go right back if only I did not have this headache, these fits, etc." The attitude of the nurses and doctors to what is regarded as a "true" illness substantiated the patient in the legitimacy of his complaints. In addition, dependency and passivity needs which they all possessed, could be exercised to their fullest. Long hospitalization and care always produced more tenacious symptoms. Therefore, around a nucleus of "acceptable" illness the patient builds conscious and unconscious protective mechanisms. Therefrom arose the difficulty in defining how much conscious simulation was constituted within an illness. In almost all cases the symptom picture was colored not by organic damage, but by psychic mechanisms which were his "locus minoris resistantiae." An injury superimposed on a lifetime character formation will give rise to various clinical pictures. In all traumatic situations, the escape into the realm of "unconsciousness" was sought for as the only way out of a situation intolerable to the waking ego. Just as sleep may be difficult for individuals with unconscious conflicts, to those with such overwhelming reality difficulties, it was looked for. There was endopsychic perception that protection lay in this direction.

SUMMARY

1. A state of unconsciousness implies that psychological as well as apparent organic phenomena have occurred. In an unconscious state psychic activity in-

variably takes place and asserts itself when the patient awakens. A characteristic of "psychic workings" is that unconscious mechanisms attach themselves to pre-existing or present organic pathology so that the latter pathology becomes exaggerated and distorted.

2. A patient with a history of classical convulsive seizures of grand mal type was found to have abnormal electro-cortical activity on the electroencephalogram. His attacks started six years before and were precipitated by an emotional upset. Under hypnosis convulsive seizures were induced by discovering and suggesting the specific psychic conflict. No other means of stimulation could produce a seizure. Electroencephalographic readings could be altered by suggesting that the patient under hypnosis regress to an age prior to his first convulsion. The problem of "epilepsy" in this individual demonstrated a predisposing constitutional background which produced no symptoms until a psychic conflict precipitated the clinical entity. There is an emotional threshold whose limits determine a convulsive seizure. Abnormal electro-cortical activity per se is of little clinical importance until a unique problem acts as a trigger which stimulates cortical activity beyond his "normal" level.

3. In two cases of middle-aged men, whose pre-traumatic physical states indicated moderate arterio-sclerosis, war experiences with consequent head injuries resulted in clinical entities resembling advanced arterio-sclerosis with mental confusion and memory impairment. These states were largely reversible and resulted in clinical improvement.

4. In organic injuries caused by war action the pre-existing psychologic state is of great importance. The men involved were under constant anxiety and tension. An individual whose pre-traumatic personality was that of a rigid emotionally repressed individual sustained a head injury with unconsciousness. The resulting symptoms resembled those of brain deterioration. He was greatly relieved and improved when a great amount of anxiety which was involved with lifelong psychic conflict, was released.

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THE PROBLEM OF CHRONIC DISEASE *

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Each year the chronic diseases cause nearly one million deaths and one billion days of disability. Victims of these diseases occupy 750,000 hospital beds and receive the equivalent full-time services of at least one-third of our physicians. Over 25 million persons suffer from some disabling or non-disabling chronic ailment. Measured in any terms, the chronic diseases are a staggering national burden, a major cause of insecurity and a challenge to society for action. It is the purpose of this paper to appraise the magnitude of the problem in terms of various statistical indices and to discuss briefly the place of the chronic diseases and psychiatry in present and future public health programs.

The amount of chronic illness in the population can be estimated with the help of those indices which are available—the deaths caused by these diseases, the cases which occur in the population at any one time (prevalence), the amount of disability which they cause, the amount of medical and hospital care which is given to them. As an index of the magnitude of the problem, mortality figures have advantages and disadvantages. The great advantage of mortality data for statistical purposes is that they have been collected routinely and with reasonable completeness through the physician, the State health department, and the Bureau of the Census since 1900 in 10 States and a

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The psychosomatic significance of this article will be understood by all who remember that the chronic diseases with which it deals are very largely those in which emotional factors are of diagnostic and therapeutic importance. These include cardiovascular diseases, diabetes, rheumatism, hay fever and asthma, digestive disturbances and others.—The Editors.

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few other cities, and from an expanding area which by 1933 included the entire United States. This makes possible very valuable historical comparisons and predictions of the future. For our present purposes, however, there are very serious limitations on the use of this material. People do not always die of the illnesses that disable them, and a bare report of a death gives no indication of the length of the illness or illnesses that preceded it, nor of the prevalence and relative importance of each type of disease in the living population.

There is no systematized program of reporting chronic illnesses and disability for the country as a whole. What we know about them comes largely from a few special canvasses which involved the training of special enumerators and the ringing of a great many doorbells. The pioneer morbidity study was made by the U. S. Public Health Service under the direction of Edgar Sydenstricker in Hagerstown, Maryland, 25 years ago. In that study, 1,800 families were followed in a series of visits for a 28-month period. A wider study, by a similar method, was made in the years 1928-1931 by the Committee on the Costs of Medical Care. This study, which covered 9,000 families, was analysed jointly by that committee and by S. D. Collins of the U. S. Public Health Service.

The most extensive canvass has been the National Health Survey, a study of 2,800,000 people made by the U. S. Public Health Service in 1935 and 1936. In this investigation we attempted to record, in one visit, the illness experience of each family for the preceding year. Our definition of "chronic disease," which for purposes of statistical analysis was necessarily somewhat arbitrary, was this: "a disabling or non-disabling chronic pathological condition known to the informant, the symptoms of which had been recognized for at least three months." Much of the following discussion is based on this study.

We have estimated that some 25 million persons suffer from some disabling or non-disabling chronic ailment. Rheumatism heads the list with almost 7 million cases in the United States in 1935 (Table I). Heart diseases, diseases of the circulatory system, allergic diseases each account for more than 3 million cases. These figures are undoubtedly low. Mass x-ray studies now indicate that about 1 percent of the population show some lesion considered tuberculous, which would mean a total number almost double our finding of 700,000 cases. The prevalence of two very important chronic diseases cannot be measured at all by the canvassing technique; these are syphilis and gonorrhea. Recent case-finding studies, however, indicate that there are in the United States some 3,000,000 persons with syphilis and 9,000,000 with gonorrhea.

Measured by disability, chronic diseases and impairments are found to be responsible for the loss from work, or other usual pursuit, of almost a billion days each year. Nervous and mental diseases, rheumatism, heart disease, hypertension and arteriosclerosis, tuberculosis and cancer account for half of this loss.

Looking at total deaths we find that a chronic disease was the cause of almost a million deaths in 1940. The great killer is heart disease which was responsible for 385,000 deaths in 1940. Next in importance came cancer which killed 165,000, hypertension and arteriosclerosis which caused 144,000 deaths (Table II).

Heart disease, hypertension and arteriosclerosis, among the leading causes of both disability and death, get top ranking among chronic illnesses (Table III), whether ranked according to prevalence, days lost from work or deaths.

Chronic disease is usually considered to be a problem of old age. While it is true that there is a high *rate* of chronic illness among the aged, it is not always recognized that since people of those ages make up only a small part of the population, more than half of all persons with known chronic diseases are less than 45 years old, and 16 percent of them are under 25. Thus, the problem in terms of the total number of afflicted persons is not so much one of old age as of maturity and even of youth. More than three-fourths of the chronic disease cases are found among persons in the productive years from 15 to 64.

Chronic diseases kill the young as well as the old (Table IV). Heart disease is found among the first five causes of death in each age group. Tuberculosis is important in youth and middle age, cancer in the young adult as well as in older people. With middle age the cardiovascular-renal diseases become of greater importance, and intracranial lesions of vascular origin and nephritis become major causes of death.

It is well known that males have a higher mortality than females throughout practically the whole life span. The trend in mortality rates for each sex shows some interesting patterns. In 1910, the death rate for ulcers was 4.6 in males, 3.6 in females. The rate has risen quite steadily in males, to 11.2 in 1940, and fallen quite steadily in females, to 2.4. Death rates from cancer of the digestive organs and peritoneum were higher among females than males until about 20 years ago. Since then, the rate for men has been increasingly higher than that for women until, in 1940, the rate was 20 percent higher in males. Males and females died from heart disease at almost the same rate in 1920. By 1940, the male rate was 37 percent higher than the female. Death rates for diabetes mellitus on the other hand are increasing faster in women than in men. The rates for tuberculosis are falling rapidly

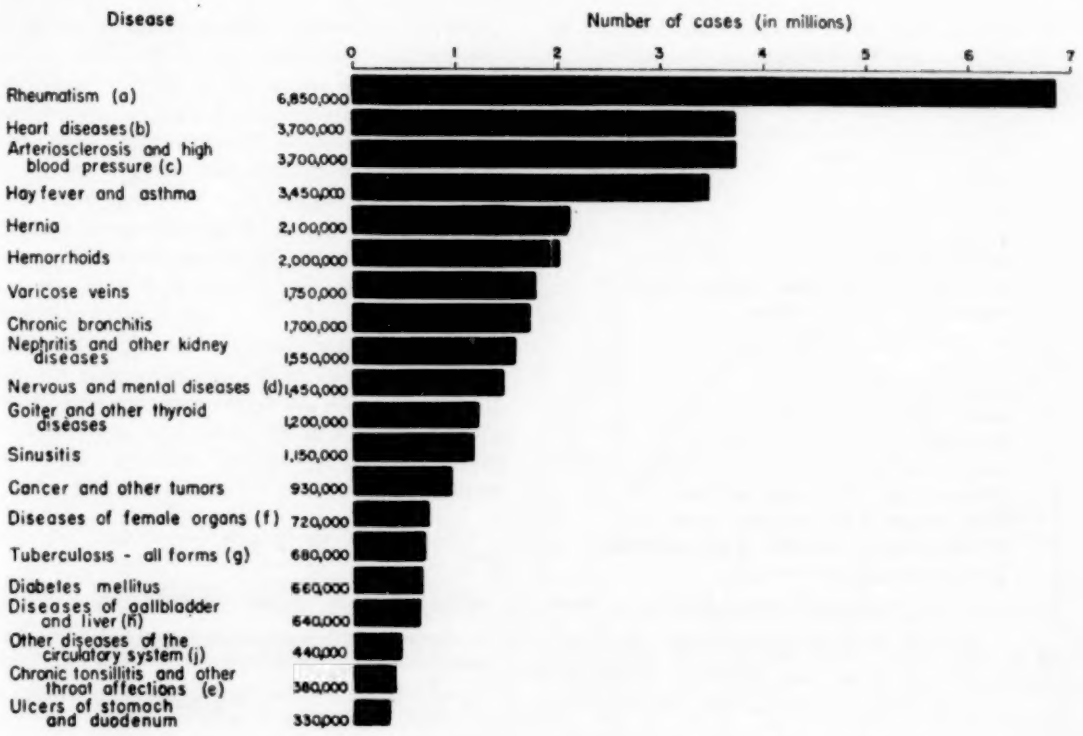

TABLE I. Estimated prevalence of specified chronic diseases in the United States (1937).

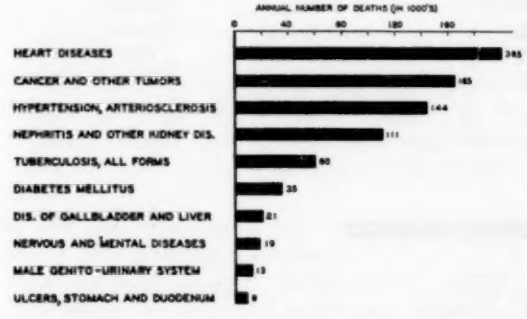

TABLE II. Number of deaths from specified chronic diseases in the United States, 1940.

both for men and women, but much faster for women. In 1920, the rate for males was 6 percent above that for females; in 1940 it was 47 percent higher.

While total mortality rates are higher among men, chronic diseases are significantly more prevalent among women. Women workers have more disability than do men workers, while housewives have a very much higher rate than women workers. These differences are found at every age, both for acute and chronic diseases.

Sydenstricker in his report on the morbidity survey of the people of Hagerstown brought out the important fact that taking all causes and all ages together the annual illness rate was 30 percent higher in females than males. Much the same rate was found by Collins in his analysis of the data of the Committee on the Costs of Medical Care. Even with the exclusion of causes associated with genital and puerperal diseases, the female rates were still almost 20 percent higher than the male.

Standard of living is another factor which has a close relationship to the occurrence of disease. We found in the National Health Survey, as have a number of other observers, that both acute and chronic diseases occur more often and have a longer duration in families with an inadequate income and unsatisfactory environment.

Chronic diseases require a large share of our medical hospital services. Of all the disabling illnesses reported in the National Health Survey, one in three was caused by chronic disease (Table V). These, however, caused about 60 percent of all disability. Of all physicians' services in the patient's home, the physician's office, or clinic, 38 percent were given to the care of chronic disease, while 3 out of 4 hospital patients in the country are hospitalized for chronic physical or mental disease.

Even this service falls short of meeting the needs of these patients. During our survey year, about 15 per-

Chronic diseases	Prevalence	Lost days	Mortality
Rheumatism	1	2	13
Heart diseases	2	3	1
Hypertension, arteriosclerosis and cerebral hemorrhage	3	5	3
Hay fever and asthma	4	9	16
Hernia	5	13	11
Hemorrhoids	6	20	18
Varicose veins	7	18	19
Chronic bronchitis	8	14	15
Nephritis and other kidney diseases	9	7	4
Nervous and mental diseases	10	1	7
Goiter and other thyroid	11	15	12
Sinusitis	12	17	17
Cancer and other tumors	13	6	2
Diseases of female organs	14	8	14
Tuberculosis	15	4	5
Diabetes mellitus	16	11	6
Diseases of the gall-bladder and liver	17	10	8
Other diseases of the circulatory system	18	16	10
Chronic tonsillitis and other throat affections	19	19	*
Ulcers of stomach and duodenum	20	12	9

* Excluded from ranking because death rates include both chronic and acute conditions.

TABLE III. Rank of specified chronic diseases according to estimated number of cases and estimated number of deaths, 1935.

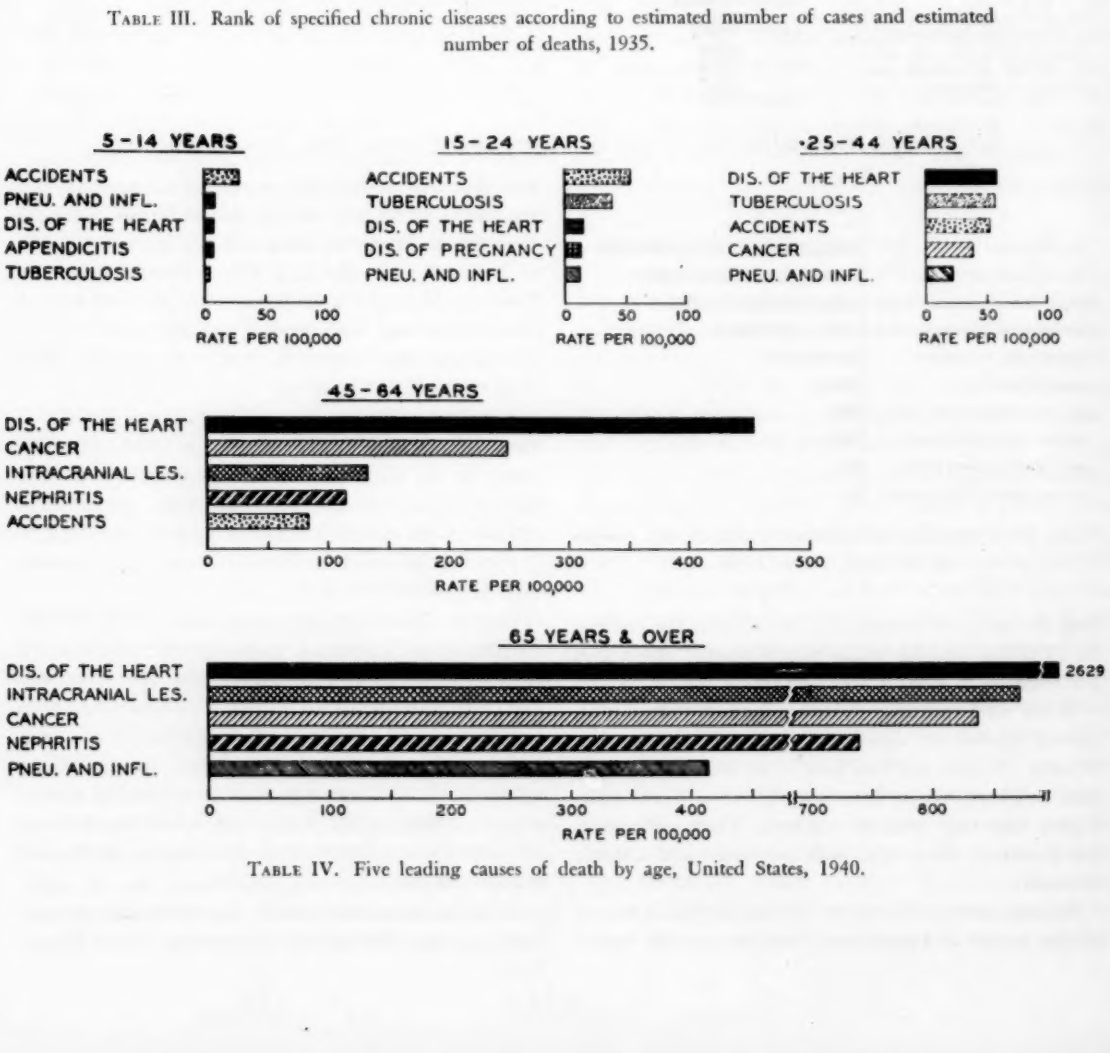

TABLE IV. Five leading causes of death by age, United States, 1940.

cent of the patients with degenerative disease, chronic digestive disease and cancer received no medical service. About a fourth of the people with rheumatism also got along with no physician service. Two out of three cancer patients received hospital care, but only one in four of those with degenerative diseases and one in eight of those with rheumatism.

What is the outlook for the future? We have many indications that the importance of chronic disease is increasing rapidly. This is a necessary result of the aging of our population.

Although it is somewhat foolhardy to be specific about the situation which will confront the next generation, there are some things we do know about it. The middle-aged and old people of 1980, for instance, have already been born. We know at what rate women of each age group have children, so we can estimate

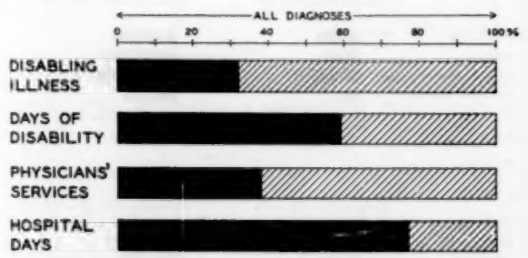

TABLE V. Importance of chronic disease in the United States, 1935-1936.

how many of them will be born, and we can assume, perhaps somewhat pessimistically, that people of a given age will have much the same illnesses and die of much the same causes in the near future as they do now.

In 1900, one person in 25 was 65 years of age or older; by 1980, it will be one in ten.

There are today some 25 million persons with a chronic disease or permanent impairment. Knowing the changing age distribution of the population, we can estimate that there were about 12 million in 1900, and there will probably be 30 million by 1980. The rate of invalidism is increasing in a similar manner.

The importance of these diseases as killers is also increasing rapidly. In 1900 the major chronic diseases were responsible for 30 percent of all deaths in the death registration area. In 1940, they were responsible for 64 percent of all deaths in the United States.

The rates for diabetes, cancer and heart disease have practically doubled since 1900. The rates for nephritis and intracranial lesions have dropped slightly. It has been predicted that if this trend continues (Table VI), by 1980 total deaths from diseases of the heart, diabetes, and cancer will be almost double what they are today.

Thus, the diseases which mean prolonged disability and suffering, and extended social and economic dependence are very much on the increase.

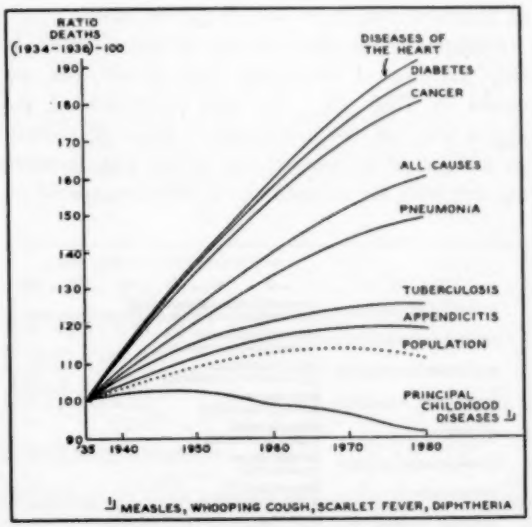

TABLE VI. Ratios of death from selected causes in the United States, 1940-1980, estimated on the basis of age-adjusted mortality rates to deaths in 1934-1936.

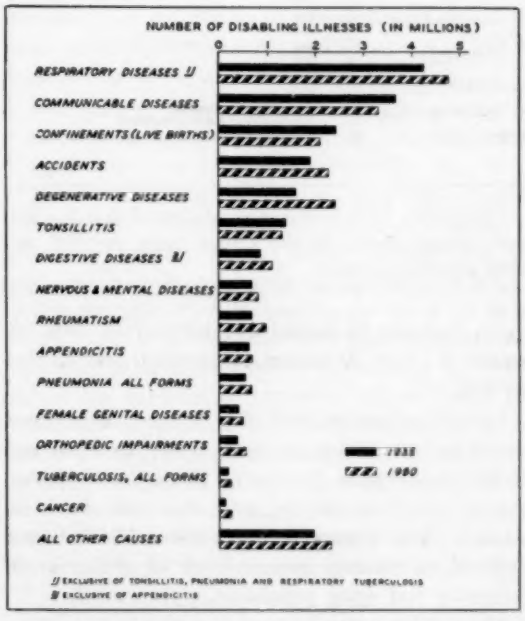

TABLE VII. Estimated number of disabling illnesses in a twelve-month period in the United States in 1935 and 1980 according to cause.

How much will this increase in the prevalence of chronic diseases affect the need for medical and hospital care?

We have estimated (Table VII) that by 1980 inci-

dence rates will be 56 percent higher for cancer, 51 percent for degenerative diseases and 41 percent for rheumatism. Days of disability from these diseases will be increased even more sharply (Table VIII).

Estimates of the total increase in patients and services, exclusive of tuberculosis and mental cases, are shown in Table IX. The total population of the United States in 1980 is estimated at about 143 million, an increase of 12 percent over 1935. This increase, together with the changed age distribution, would require, exclusive of mental and tuberculosis cases, increases of about 20 percent in physician and hospital services.

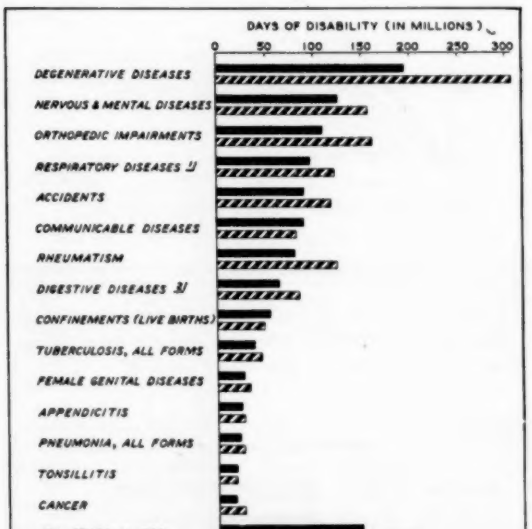

TABLE VIII. Estimated number of days of disability in a twelve-month period in the United States in 1935 and 1980 according to cause.

Looked at another way, the expected requirement would be an addition of about 30,000 physicians and 80,000 hospital beds. Services for illness due to chronic diseases would account for more than half of this increase. These figures represent the additional care required to maintain present levels of service in an increasing and aging population.

The foregoing discussion of statistical indices of the problem of chronic illness indicates that the control of the chronic diseases is a major problem which will increase in magnitude. Organized services for the control of these diseases have been largely limited to tuberculosis and venereal disease. More recently there has been a trend toward expansion of public health control of certain other chronic diseases. Full-time cancer control programs offering some medical service have been established in 15 States. The crippled children's program of the U. S. Children's Bureau provides medical care for orthopedic conditions in all States and in 17 States for crippling cardiac conditions of young people. Organized activities in the field of industrial hygiene, initiated only a few years before the war, have been greatly expanded as a result of large scale employment of women, older workers, and minors, and the development of new occupational hazards.

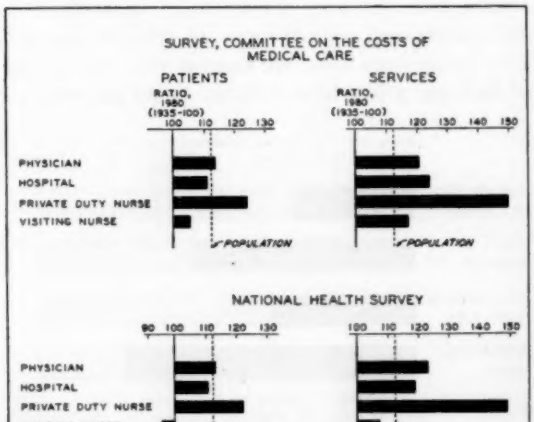

TABLE IX. Ratios of patients receiving medical and nursing care in a twelve-month period, and of the corresponding services in the United States in 1980, to patients and services in 1935 (estimated).

The integration of mental hygiene in the official public health movement has not been extensive; at the State level services have been organized in only 12 States. It seems probable, however, that future expansion of this field will be accompanied by the development of psychiatric services designed to supplement existing activities. For example, the psychiatrist may aid materially in the control of the venereal diseases through the guidance, adjustment, and education of young persons. Case-finding activities in the control of tuberculosis are of no avail unless the patients are brought to treatment, a task in which the techniques of the psychiatrist may play an important role. The psychiatrist has an obviously important place in the industrial hygiene program particularly during the war emergency.

Additional opportunities for the integration of psy-

chiatry in the public health program will develop as cardiac disease among adults, rheumatism, and other major chronic diseases are included in the scope of public health services. Adequate organized control of these diseases will require increasing attention to the psychic as well as the somatic aspects of the problem. Both current and postwar planning should include exploration of the most effective uses and application of psychiatry in the prevention and treatment of chronic disease.

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PSYCHOSOMATIC DISORDERS AS REVEALED BY THIRTEEN MILLION EXAMINATIONS OF SELECTIVE SERVICE REGISTRANTS *

Colonel LEONARD G. ROWNTREE, Med.-Res.†

Psychosomatic medicine ** is facing its day of opportunity. Fate is staging a nationwide experiment, one capable of revealing the role of war in the pathogenesis of certain diseases. We are now living in an environment of unusual stress. Millions of young men are being called into service; families and homes are being disrupted; men and women are breaking physically, mentally and emotionally in alarming numbers. Emotions dominate the nation. What role is the stress of war playing in the rejections of registrants, in the discharges of men from the fighting forces, and in the health of civilians throughout the land?

Disease is neither wholly "physical" nor wholly "mental," rather it is both physical and mental. Correct weight must be accorded both factors in considering the pathogenesis, diagnosis, prognosis, prevention and cure of many diseases now prevalent. For purposes of study, clinical material abounds. Psychosomatic disorders are rampant. Now, therefore, the present is the time to determine the effects of the strain of war on emotions, on physical and mental processes, on the nervous and vascular systems, on visceral functions and on health and personality. Now, but to a greater extent in the postwar era, will come the opportunity to study the effects of war casualties, of trauma and bodily injuries on the emotional and mental life and personality of the victims of violence. Such investigations call for careful planning in advance and for expert investigators of the highest order.

But, first, let us deal with the incidence of psychosomatic diseases. Selective Service can contribute something definite here in the field of statistics.

Last year at your meeting we presented a paper covering the incidence of psychosomatic diseases in peacetime selection for the Army. At that time we outlined the most striking changes in Selective Service policy and procedures incident to the attack on Pearl Harbor and to our entrance into war. This involved the need for an unprecedented expansion in the armed forces, the lowering of standards for admission, the utilization of limited service men, the changes in the character of the physical examination conducted by Selective Service, the waiving of certain defects by the military authorities and the correction of some of these remediable defects subsequent to induction, and finally the establishment of the age range at its present level, 18 to 38 years of age.

Furthermore, it was revealed that the 4-F pool had grown continuously until at that time it had attained the high level of 2,800,000. The rate of rejection in peacetime was indicated as 50 percent or over.

Attention was called to the difficulties attending psychiatric selection and to the various safeguards then in operation and also to the Selective Service plan for

* Presented at the joint session of the American Psychiatric Association and American Society for Research in Psychosomatic Problems, May 15, 1944.

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** The term "psychosomatic" used in this and in similar connections requires special definition. Few if any human disorders are free of "psychic" components. In this report "psychosomatic disorders" refers to clinical conditions in which the organic symptoms are largely determined by emotional factors. Psychosomatic medicine connotes merely systematic attention concurrently to both the emotional and the organic etiological factors—in diagnosis as well as in treatment.—Editors' Note.

a national Medical Survey Program, whereby Selective Service would attempt to assemble in the community and transmit to the induction stations available information concerning the registrant pertinent to selection.

Psychopathic trends relative to age were indicated by charts and tables—a decrease with age for illiteracy, a slight increase with age for psychopathic personality and psychoneuroses, a more marked increase with age for mental deficiency, psychoses, inebriety and drug addiction. Likewise, a trend for race was indicated—a high rate for Whites for psychoneuroses and psychoses, and for Negroes for illiteracy. The incidence and rejection rates for psychosomatic diseases were shown as high for the Whites as for the Negroes except for hypertension. Neurocirculatory asthenia and tachycardia were 6 or 7 to 1, while peptic ulcer was ten times as frequent in the Whites. In that article attention was also called to the difficulty of obtaining satisfactory statistics in these fields and the need for some special effort in this connection.

The earlier results were derived from a study of the records and reports of physical examination on D.S.S. Forms 200. The present findings were obtained from D.S.S. Forms 221 which detail the major part of the examination as conducted at the induction stations. The rejections in the former group were preponderantly Selective Service local board rejections, while those now under discussion are preponderantly induction station rejections.

Before presenting the current figures on psychosomatic diseases, it seems desirable to consider the size and composition of the 4-F pool as it exists at present. This furnishes a much needed perspective. The 4-F pool has grown steadily during the past year at a rate of approximately 85,000 per month. This has continued despite the drastic lowering of standards which has included among other changes the induction of limited numbers of men with uncomplicated venereal disease, with hernia, and illiteracy, and large numbers of men with dental defects. The size and composition of the 4-F pool at present is shown in Table 1.

The age distribution in this group is of special interest: 1,400,000 under 26 years of age, approximately 700,000 between the ages of 26 and 30 years, and 1,400,000 between 30 and 38 years of age. Above 38 years of age, experience has shown that there are few that can qualify and serve satisfactorily. Above 38 years, the rejection rate is over 60 percent and the discharge rate unusually high.

Attention is called to figures presented on rejections for mental disease—601,300 or 15.7 percent for mental disease (excluding illiteracy), 536,200 or 14 percent for mental deficiency (including illiteracy, 200,900 or 5.2 percent for neurological disorders, totalling in these categories 1,340,000 or about 35 percent of the grand total of the rejected.

In addition it should be stated that during the last year the discharges from the fighting forces have increased materially and now number more than 500,000. The rate for neuropsychiatry has continued high, definitely above 40 percent, some 216,000 as of February 1, 1944.

The picture as a whole shows that of some 13 to 14,000,000 examinations given, there are approximately 4 to 5,000,000 discards—rejectees or men discharged

TABLE 1

ESTIMATED PRINCIPAL CAUSES FOR REJECTION OF REGISTRANTS 18-37 YEARS OF AGE IN CLASS IV-F, AS OF APRIL 1, 1944

(Preliminary)

Principal cause for rejection	Number	Percent
Total	3,836,000	100.0
Manifestly disqualifying defects	403,100	10.5
Mental disease	601,300	15.7
Mental deficiency [1]	536,200	14.0
Physical defects	2,242,500	58.4
Syphilis	288,800	7.5
Musculoskeletal	287,500	7.5
Cardiovascular	246,800	6.4
Hernia	217,700	5.7
Neurological	200,900	5.2
Eyes	197,800	5.1
Ears	148,000	3.9
Tuberculosis	100,800	2.6
Lungs	65,600	1.7
Feet	48,800	1.3
Abdominal viscera	46,900	1.2
Kidney and urinary	39,000	1.0
Varicose veins	38,400	1.0
Genitalia	38,100	1.0
Endocrine	37,100	1.0
Teeth	35,400	0.9
Skin	23,400	0.6
Neoplasms	23,400	0.6
Nose	23,100	0.6
Gonorrhea and other venereal diseases	18,000	0.5
Hemorrhoids	15,500	0.4
Mouth and gums	10,800	0.3
Infectious and parasitic	4,000	0.1
Throat	3,800	0.1
Blood and blood-forming	3,600	0.1
Underweight, overweight and other	79,300	2.1
Non-medical	52,900	1.4

[1] Includes registrants rejected for educational deficiency before June 1, 1943 and for failure to meet minimum intelligence standards after that date, as well as those rejected for mental deficiency.

Source: Forms 110, 111, 140A and 221.

from service. More than a third of the rejections, and more than 40 percent of the discharges, are for neuropsychiatric reasons.

The question arises as to whether psychosomatic diseases should be included in this category. They are closely related in many instances at least. They represent the visceral expression of disease, functional or organic in nature, rather than nervous and mental diseases *per se*.

The present figures for psychosomatic disease during war time selection are shown in Table 2. For convenience of reference we have included in Table 2 (in parenthesis) some figures from the last paper dealing with peacetime rejections. They thus admit of easy comparison.

The most recent figures are those of November and December 1943, based on a sample of 70,000 D.S.S. Forms 221. These data reveal:

(a) *Asthma:* Incidence and rejection rates have nearly doubled for the total group and for the Whites and Negroes also.

TABLE 2

SELECTED PSYCHOSOMATIC DISEASES AMONG SELECTIVE SERVICE REGISTRANTS IN PEACETIME [1] AND IN WARTIME [2]

(Preliminary)

	Per 1000 registrants examined					
	Incidence of defect		Incidence of defect in rejected men		Incidence as principal cause for rejection	
ALL RACES						
Total	27.7	(17.7)[3]	23.8	(14.2)[3]	20.9	(8.4)[3]
Asthma	8.4	(4.8)[3]]	7.5	(4.1)[3]	6.0	(2.8)[3]
Peptic ulcer	4.3	(3.3)[3]	4.3	(3.1)[3]	3.8	(2.5)[3]
History of peptic ulcer	3.4	(1.1)[3]	3.1	(0.7)[3]	2.3	(0.2)[3]
Gastrointestinal syndrome	1.7	(0.7)[3]	1.6	(0.4)[3]	1.6	(0.2)[3]
Neurocirculatory asthenia	8.6	(3.4)[3]]	6.4	(2.6)[3]	6.4	(1.3)[3]
Functional disorders of expressive movements	1.3	(4.4)[3]	0.9	(3.3)[3]	0.8	(1.4)[3]
WHITE						
Total	31.1	(18.8)[3]	26.4	(15.2)[3]	23.1	(9.0)[3]
Asthma	8.5	(4.9)[3]	7.5	(4.2)[3]	6.4	(2.8)[3]
Peptic ulcer	5.2	(3.6)[3]	5.2	(3.4)[3]	4.6	(2.8)[3]
History of peptic ulcer	4.2	(1.1)[3]	3.8	(0.8)[3]	2.9	(0.2)[3]
Gastrointestinal syndrome	2.0	(0.8)[3]	1.9	(0.5)[3]	1.9	(0.3)[3]
Neurocirculatory asthenia	10.0	(3.7)[3]]	7.1	(2.8)[3]]	7.0	(1.4)[3]
Emotional disorders of expressive movements	1.2	(4.7)[3]	0.9	(3.5)[3]	0.7	(1.5)[3]
NEGRO						
Total	16.5	(7.7)[3]	15.5	(5.8)[3]	13.3	(4.0)[3]
Asthma	7.8	(3.9)[3]]	7.4	(3.4)[3]	5.9	(2.5)[3]
Peptic ulcer	1.4	(0.6)[3]]	1.4	(0.4)[3]	1.3	(0.4)[3]
History of peptic ulcer	0.9	(0.4)[3]	0.8	(0.2)[3]	0.2	(0.1)[3]
Gastrointestinal syndrome	0.6	—	0.6	—	0.6	—
Neurocirculatory asthenia	4.5	(0.8)[3]]	4.2	(0.6)[3]	4.2	(0.4)[3]
Functional disorders of expressive movements	1.3	(2.0)[3]	1.1	(1.2)[3]	1.1	(0.6)[3]

[1] Peacetime figures are from a sample of Forms 200 dated September 30, 1941, or earlier, for 15 states.
[2] Wartime figures are for November and December 1943 and based on a random sample of forms 221.
[3] Peacetime figures are shown in parenthesis.

(*b*) *Peptic ulcer* has increased nearly 50 percent for both total incidence and rejection rates. The increase has been relatively greater, however, for the Negro—2½ times that of the peacetime rejections.

(c) *History of peptic ulcer* increased still more, to 3 times that reported last year; the increase has been preponderantly in the Whites.

(d) *Gastrointestinal syndromes* likewise have increased in number to 2½ times that previously reported.

(e) *Neurocirculatory asthenia* also has more than doubled for the group but it tremendously increased in the Negro, 5 times that reported last year. These figures call for special study to determine just what has been included now as opposed to our earlier report. Many cases of tachycardia and transient hypertension may have been included in the present N.C.A. figures so that the greater figures may represent something other than actual increase.

There exists, however, in these statistical studies abundant evidence of marked increase and perhaps a doubling of incidence and rejection rates in the field of psychosomatic diseases. This may represent the influence of war stress and strain and, to some extent, it may also reflect the desire of some registrants to avoid service. The most striking evidence, however, is the marked increase in incidence of psychosomatic disease in the Negro who in peacetime appeared relatively immune. As a result it can be stated that the psychosomatic disorders are appearing in increasing frequency in the Negro as well as in the White.

DISCUSSION

Psychosomatic medicine is in the limelight at present. Its importance is daily being better understood. However, the pictures presented are still indistinct and the part played by psychic factors lacks definition. Better focusing and clearer ideas as to sequence and the serial arrangement of events are desirable. We need additional insight into the qualitative and quantitative influences of emotions on the individual as a whole and on his nervous and vascular system, on his systems and organs, on physiological activities and chemical reactions. We need to see the functional responses and the organic changes in viscera, and to center attention on the transition from reversible functional responses to irreversible organic pathology. In addition we must know more of the individual concerned, his constitution and personality and the changes effected in the latter as the result of emotional upset.

Studies such as those carried out by the cardiologists are most urgently needed. They, at infinite trouble, reexamined 5,000 rejectees in order to orient themselves and the medical examiners of the local boards and the induction stations. They corrected the erroneous impression that functional heart diseases are greatly increased and that organic disease of the heart is relatively infrequent. They showed that in the cardiovascular rejectees rheumatic heart disease, valvular lesions and myocardial involvement are still responsible for approximately 50 percent of the rejections. They studied the syndrome neurocirculatory asthenia and found it synonymous with effort-syndrome disordered action of the heart. They finally determined that it was closely related to, if not dependent upon, psychoneurosis. Studies of this kind are greatly needed in several psychosomatic disorders.

Terminology in psychosomatic disease is still loose, unsatisfactory, still confusing and at times misleading. It, also, is in need of clarification.

BRAIN WAVES AND CLINICAL FEATURES IN ARTERIOSCLEROTIC AND SENILE MENTAL PATIENTS *

W. T. LIBERSON, M.D., AND C. A. SEGUIN, M.D.†

INTRODUCTORY

In a previous paper (4) it was pointed out that the groups of mental patients with either cerebral arteriosclerosis or senile psychosis presented high percentages of severely abnormal EEG records. Only the group of individuals with mental disorders of toxic origin presented approximately the same proportion of markedly abnormal tracings. About 10 per cent of arteriosclerotic and senile patients showed moderately abnormal records, and about 35 per cent showed borderline features. In 20 per cent of cases the EEG's were perfectly normal (See Figure 1).

The fact that the "organic" mental patients show a relatively high percentage of abnormal records is not surprising. The presence of many cases in this group with normal or only borderline EEG features remains to be explained.

In order to contribute to the clarification of this problem, the clinical symptoms as related to the EEG patterns were analyzed in 53 patients with cerebral arteriosclerosis or senile psychosis. The result of this study is the object of the present paper.

* Acknowledgments are made to Dr. C. C. Burlingame, Psychiatrist-in-Chief of the Institute of Living, who made this research possible, and to Dr. Anne Roe for her helpful discussion of the statistical evaluation of our data.

† Physiological Research Laboratory, Institute of Living, Hartford, Connecticut.

METHOD

Technique: The EEG examinations were performed according to a technique described elsewhere (5). A Grass six channel EEG machine was used. Both

bipolar and monopolar leads were used. Particular attention was given to evaluate separately the patterns recorded in the bipolar parieto-occipital leads and those recorded in the anterior leads (monopolar or bipolar). The standard position of the electrodes is shown in Figure 2.

Classification of records: The records were classified

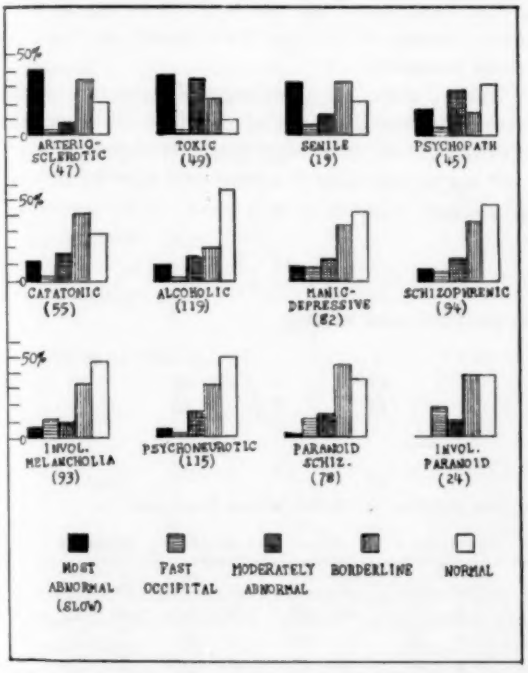

FIG. 1. Distribution of various types of EEG records in different mental diseases. Each rectangle represents the percentage of records belonging to one of the 5 different EEG groups (see the text). The figures in parenthesis indicate the number of patients (4).

in five groups according to the classification previously outlined (4). These groups are as follows:

1. *Severely abnormal records with slow activity.* This group includes the records with (a) predominant slow activity below 8 per second recorded in the occipital region (regardless of its presence or absence in the anterior leads); (b) predominant slow activity with a frequency of 6 per second or below recorded in the anterior leads; (c) paroxysmal abnormality with slow waves (below 8 per second) or with "wave and spike" formations recorded in any region of the brain, provided that their amplitude is above the highest amplitude of the alpha waves found in the same record and not below 50 microvolts; (d) consistent episodic abnormality in the occipital region with waves of at least alpha amplitude and frequency below 5 per second; (e) definite focal abnormality.

2. *Fast abnormality in the occipital region.* This group includes (a) records with predominant and organized fast activity showing brain waves of over 12 per second in the occipital region regardless of the rhythm recorded in the anterior leads (with average amplitude of at least 20 microvolts); and (b) paroxysmal bursts of this activity with waves of at least 50 microvolts.

3. *Moderately abnormal records with slow activity.* This group includes (a) marked episodic abnormality in any region of the brain with waves of the same

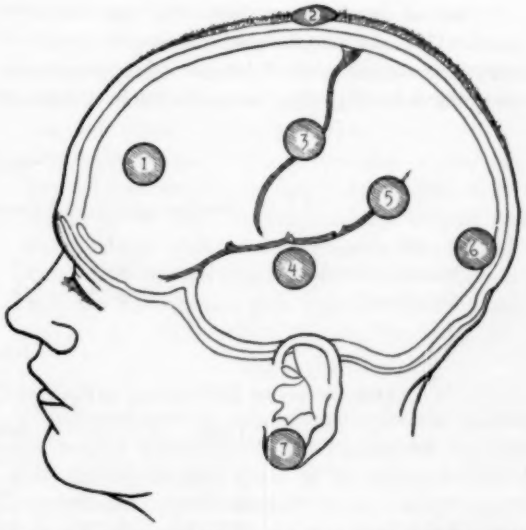

FIG. 2. Standard positions of the electrodes: 1. Frontal; 2. Vertex; 3. Central; 4. Temporal; 5. Parietal; 6. Occipital; 7. Ear.

amplitude as the alpha rhythm, unless included in Group 1; (b) predominate 7-8 per second activity in the anterior leads; (c) episodic abnormality with waves over 5 per second recorded in the occipital region except when followed by drowsy patterns; (d) pronounced slow activity during hyperventilation of 2 minutes' duration in individuals over 35 years of age.

4. *Borderline patterns.* This group includes (a) predominant organized 8-8.5 per second activity in the occipital region; (b) predominant organized 11.5-12 per second activity in the same region; (c) predominant and organized fast activity (over 12 per second) in the anterior leads; (d) poorly organized alpha activity in the anterior leads (bipolar and monopolar) or absence of such activity provided that the occipital regions (bipolar leads) show a well-developed and consistent alpha rhythm; (e) alpha activity occupying less than 10 per cent of the occipital record with or without low amplitude slow or fast activity; (f) bursts of 7-8 per second activity in the anterior leads; (g) pro-

nounced slow activity during hyperventilation in individuals over 20 and under 35 years.

5. *Normal tracings.* This group includes irregular patterns provided that they have not been considered under one of the previous headings.

Analysis of the clinical data: The diagnoses were made after a careful analysis of the complete records of the patients. Special attention was given to (1) the uniformity of the clinical criteria in defining the symptoms or in making the diagnoses; and (2) independence of the evaluation of the clinical data from the results of the EEG examination.

At first all the symptoms shown by the patients were listed. Then the frequency of the incidence of each symptom was determined for the whole population. Only the following symptoms occurred in a sufficient number of cases to warrant reliable data: (1) confusion; (2) depression; (3) agitation; (4) irritability; (5) hallucinations; (6) delusions; (7) anxiety; and (8) memory defects. The last symptom could be determined only in non-confused individuals.

Seven groups of patients were formed, each one characterized by the presence of one of the seven major symptoms. Memory disorders were disregarded for the reasons explained on page 33. For each one of these groups, percentages of tracings belonging to various EEG categories were determined. Conversely, for each one of the EEG groups, percentages of the incidence of the above mentioned clinical symptoms were computed.

RESULTS

Among the 53 patients studied in this paper 19 were diagnosed as senile and 34 as arteriosclerotic. Table 1 shows the distribution of various EEG groups in this population. This distribution differs slightly from the one shown in figure 1. These discrepancies are due to the sampling errors. In view of the fact that some of these groups were relatively small, groups 2 and 3 were combined as well as groups 4 and 5. In this way we could study two opposite groups; first, a group characterized by a severe slow abnormality (EEG group 1), and second, a group characterized by the absence of any definite abnormal pattern (combined groups 4 and 5). The remaining group (EEG groups 2 and 3 combined) was characterized by intermediary EEG features. In this way three almost equal groups could be studied.

Table 2 shows the percentages of occurrence of the records belonging to one of the three above defined EEG groups for each major clinical symptom.

It can be concluded from this table that the patients displaying confusion show a much higher percentage of markedly abnormal records (63%) as compared with the percentage of tracings without any definite EEG abnormality (31%). The same can be said about patients showing a marked irritability (respectively 56% and 22%). On the contrary, patients displaying marked delusional material present a lower percentage of severely abnormal records (17%) than those of normal or borderline tracings (50%). Analogous findings were observed for the patients with anxiety or agitation.

Table 3 shows for each one of the three EEG groups the proportion of patients displaying various clinical symptoms. Figure 3 shows the clinical "profiles" for two opposite EEG groups (severely abnormal records with slow activity and tracings without any definite abnormality).

One can conclude from Table 3 and figure 3 that all groups of patients show some predominant features. However, in the group of patients with severely abnormal EEG's, confusion and irritability are more prominent, whereas in the normal and borderline EEG

TABLE 1

DISTRIBUTION OF EEG GROUPS IN THE POPULATION STUDIED

EEG groups	1	2	3	4	5	2 plus 3	4 plus 5
Number of patients	19	7	9	13	5	16	18
Percentages	36	13	17	25	9	30	34

TABLE 2

DISTRIBUTION OF EEG GROUPS IN PATIENTS DISPLAYING ONE OF THE SEVEN MAJOR SYMPTOMS

EEG groups	Confusion		Irritability		Hallucinations		Agitation		Delusions		Anxiety		Depression	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
1	10	63	5	56	2	33	5	29	2	17	1	14	6	33
2 plus 3	1	6	2	22	2	33	4	24	4	33	4	56	7	39
4 plus 5	5	31	2	22	2	33	8	47	6	50	2	28	5	28

TABLE 3

DISTRIBUTION OF MAJOR SYMPTOMS IN EACH EEG GROUP

EEG groups	1 N	1 %	2 plus 3 N	2 plus 3 %	4 plus 5 N	4 plus 5 %
Confusion	10	52.6	1	6.2	5	27.7
Irritability	5	26	2	12.4	2	11
Hallucinations	2	10	2	12.4	2	11
Depression	6	31.5	7	43.7	5	27.7
Agitation	5	26	4	24.8	8	50
Delusions	2	10	4	24.8	6	33
Anxiety	1	5.2	4	24.8	2	14

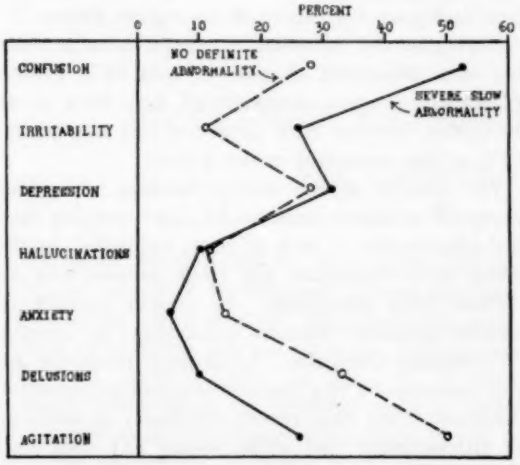

FIG. 3. Clinical profiles of two groups of patients with opposite EEG characteristics (Group 1 and combined Groups 4 and 5).

groups, agitation, anxiety, and delusions are the most prominent symptoms.

It is of interest to represent the incidence of the various clinical symptoms in relative values. Figure 4 shows a diagram which illustrates this point of view. Each of the circles which are shown by this figure should be considered as a unity representing a clinical picture of a group of patients selected according to their EEG characteristics and considered as a whole. Different sectors illustrate the relative value of each symptom in this total clinical picture. While in the group of patients with marked slow abnormality, confusion and irritability overshadow the complex of anxiety—agitation—delusions, the opposite is observed in the group of patients with normal or borderline records. Hallucinations and depression show about the same relative values in both groups.

Memory disorders, which constitute a very important clinical symptom in organic psychoses, were not considered in this comparative study. It was indeed impossible to evaluate this symptom in confused patients and therefore impossible to have comparative data for EEG groups with opposite characteristics.

DISCUSSION

Electroencephalography reveals a greater percentage of positive findings in "organic" than in "functional" disorders. Although some of the schizophrenic, psychoneurotic, and involutional patients show abnormal features in their EEG's, the majority of these patients

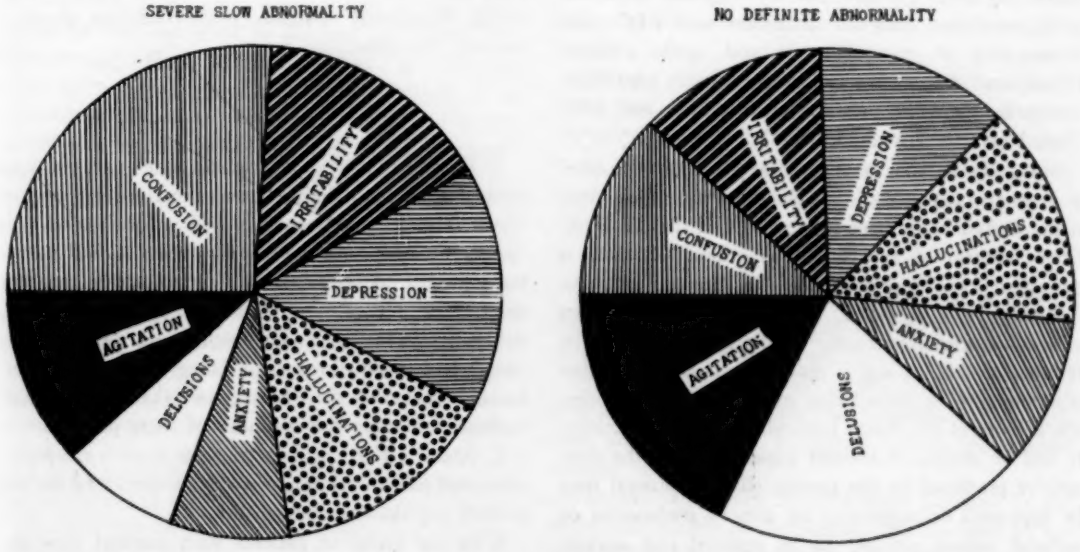

FIG. 4. Distribution of relative values of various clinical symptoms for two groups of patients with opposite EEG characteristics.

present normal or only borderline tracings. It is therefore tempting to consider the individuals with abnormal EEG's as "organic" patients and those with normal EEG's as suffering from a "functional" disease.

The present study does not substantiate this point of view. It embraces only typical organic patients inasmuch as they can be identified by the clinical examination and by the evolution of the disease. Nevertheless, about a third of these patients have a normal or only borderline EEG. These organic patients show, however, a different constellation of symptoms than those with severe slow abnormality. In other words, there is an association between the EEG patterns and the clinical symptoms in a group of patients with the clinical diagnosis of the same organic disease.

This finding seems to be of a great doctrinal value. Thus the absence of EEG abnormality in most of the patients suffering from so-called functional disorders does not necessarily exclude the absence of somatic factors which may be involved in those diseases. The distribution and the degree of somatic disturbances are probably of decisive importance from this point of view. When these factors of a somatic disorder are such as to induce confusion or intellectual impairment (4) there is more probability of the occurrence of abnormal patterns than when they determine the clinical picture of anxiety—agitation—delusions.

The symptoms represented on Figure 3 will now be considered separately.

Confusion appears in about 50 per cent of the patients with severely abnormal records and only in 27 per cent of those without any definite abnormality. Hoch and Kubis (3) have already suggested that there is a correlation between confusion and EEG slow abnormality in arteriosclerotic and senile patients Chi-square analysis showed a statistically significant association between presence of confusion and EEG Type I (severe slow abnormality).

Irritability may be considered as a release phenomenon, as the patients are unable to control their emotional outbursts. It is of interest to find that an insufficient control of exaggerated emotional reactions is associated with abnormal records in "organic" patients.

Anxiety and agitation, however, occur less often with a marked abnormality in the EEG record. The rational of this finding is not clear. It is known that emotion-arousing stimulation usually reduces the electric activity of the brain, particularly the slow activity. It will be shown in another paper (9) that the slow activity produced by the electric shock treatment may be depressed or suppressed by sensory stimulation or induced mental activity. In an agitated and anxious patient some reduction of slow activity may take place, particularly under the emotional stress of an EEG examination. This factor, however, is hardly sufficient to explain the usual absence of slow abnormality in anxious patients.

Delusions have some tendency (91 chances in 100 according to chi-square analysis) to occur relatively more often in patients with normal EEG patterns. It has been pointed out by different workers (1, 2) that paranoid schizophrenics show less abnormal records than patients suffering from other types of dementia præcox. Figure 1 illustrates these findings, although some relationship is found between fast activity and paranoid ideas (4). It is of interest to find analogous observations in an organic disease.

Depression and hallucinations seem to occur in about the same proportion of cases in both EEG groups. (Chi-square analysis demonstrated that there is no association between these symptoms and any of the EEG groups considered in this paper.)

The analysis of the interrelationships of various groups of symptoms seems to be more revealing than the consideration of each of them separately. In the group of arteriosclerotic and senile patients with no definite EEG abnormality, the clinical complex of anxiety—agitation—delusions overshadows the complex of confusion—irritability. Involutional psychotics are also characterized by a complex of agitation—anxiety—delusions. Thus EEG reveals two forms of psychosis of arteriosclerotic and senile origin: (1) with very abnormal tracings, and (2) with normal or borderline tracings. The latter is linked with involutional psychoses.

The importance of the interrelationship of different symptoms and clinical complexes may explain why many "functional" patients with confusion show a normal electroencephalogram.

SUMMARY

1. Fifty-three arteriosclerotic and senile patients were studied from both the EEG and the clinical points of view. The EEG's were classified according to previously defined criteria. The following clinical symptoms proved to be particularly important in relation to this study: confusion, irritability, agitation, anxiety, delusions, depression, and hallucinations. Memory disorders had to be disregarded, being obscured by confusion. However, they have been taken into consideration in making the diagnosis of these patients.

2. About a third of these patients show a markedly abnormal pattern (slow), whereas another third do not present any definite abnormality.

3. In the group of patients with marked slow abnormality, the clinical complex confusion—irritability overshadows the complex anxiety—agitation—delusions.

The opposite finding is observed in the group of patients with normal or only borderline tracings.

4. The doctrinal significance of the existence of definite organic lesions which do not produce a marked EEG abnormality when associated with anxiety, agitation, and delusion, is stressed. The relationship of this group of patients with those suffering from involutional psychosis is suggested.

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BRAIN WAVES AND HEREDITY IN MENTAL DISEASES *

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INTRODUCTORY

The importance of hereditary factors in the determination of individual electroencephalograms has been considered by several workers. The similarities of the tracings recorded on identical twins has been pointed out (1, 7). Lennox, Gibbs and Gibbs (4, 5) made analogous observations on epileptic patients. Their studies proved the importance of hereditary factors in electroencephalography as related to the clinical studies (6). (See also 10, 11, 12.)

This problem is of great significance (both theoretical and practical) in mental diseases where heredity is often considered as playing an important role. To our knowledge, the only paper related to this problem is the one published by Kreezer and Smith (3). These authors found a great incidence of abnormal EEG's in hereditary types of mental deficiency. It is, however, of interest to determine whether this is true for all mental disorders, particularly the "functional" ones. This is the object of this paper.

SUBJECTS

Only young subjects were studied for this paper. The individual EEG's may be influenced in mental patients by previous "organic" diseases as well as by the toxic factors of endogenous or exogenous origin (for example, a prolonged use of sedation). These influences, often unknown and increasing during the life's span, may change completely the original hereditary type of the record. The other reason which is in favor of the selection of young subjects for the purpose of this study is that it is easier to gather the information concerning their families than it is for the more aged individuals. Most of the time, the young patients are brought to the hospital by their parents, who can give reliable data concerning the personal as well as the family history.

The upper age limit for our group of patients was at first fixed at 20 years; then it was moved to 22 years in order to include the subjects whose ages are at the limit of the second decade. The lower limit (13 years) was not determined by a free choice; there were very few patients under 13 years of age available for this study.

The total number of cases examined is 118. Table 1 shows the distribution of the subjects according to the age and Table 2 shows the distribution according to the diagnosis. Thirteen of these patients gave a personal history of a neurological disorder.

METHOD

The technique of the EEG examination as well as the criteria for the classifications of the records has been described in previous papers (8, 9).

The EEG's were classified in five groups: 1) severe slow abnormality; 2) severe fast abnormality; 3) moderate abnormality; 4) borderline records; 5) normal records.

The data concerning heredity were gathered by the individual doctors of the patients and recorded in the clinical histories. Only those concerning the grandparents, parents, brothers, sisters, uncles, aunts and first cousins were considered. These data were after-

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ward analyzed and classified. Special attention was given to gather the clinical data independently from the EEG findings.

TABLE 1

DISTRIBUTION OF AGES IN THE POPULATION STUDIED

Age	Number of cases	Percentage
13	2	1.7
14	3	2.5
15	5	4.2
16	7	5.9
17	14	11.9
18	14	11.9
19	19	16.1
20	13	11.0
21	21	17.8
22	20	16.9

TABLE 2

DISTRIBUTION OF THE DIAGNOSES

Diagnosis	Number of cases	Percentage
Schizophrenia:		
(a) Simple	7	5.9
(b) Hebephrenic	7	5.9
(c) Catatonic	12	10.1
(d) Paranoid	16	13.5
(e) Mixed	17	14.4
Total	59	49.8
Psychopathic personality	21	17.8
Mental Deficiency	5	4.2
Psychoneurosis	11	9.3
Psychopathic personality with psychosis	2	1.7
Psychosis with mental deficiency	5	4.2
Psychosis with endocrine dyscresia	3	2.5
Manic-depressive	3	2.5
Reactive maladjustment	5	4.2
Malingering	1	.9
Syphilis of the central nervous system.	1	.9
No diagnosis	2	1.7
Total	118	

The following groups of mental patients were formed according to the family history:

Group 1. Patients with family records of a) mental cases; b) psychopathic personalities; c) alcoholics; d) suicidal individuals.

Group 2. Patients with family history of a) "nervous breakdown"; b) "nervousness"; c) emotional instability.

Group 3. Patients who had no case of nervous or mental condition in the family.

This is a rough classification of the degrees of hereditary background; it proved to be of value for our purpose.

RESULTS

Table 3 shows the distribution of patients according to the above mentioned EEG classification.

Table 4 records the distribution of the same patients according to the different hereditary groups.

Table 5 shows the percentages of incidence of different types of EEG according to the hereditary background.

TABLE 3

DISTRIBUTION OF PATIENTS ACCORDING TO EEG CLASSIFICATION

EEG classification	Number of cases	Percentage
Group I	17	14.4
Group II	6	5.0
Group III	18	15.2
Group IV	35	29.6
Group V	42	35.6

TABLE 4

DISTRIBUTION OF PATIENTS ACCORDING TO HEREDITARY FACTORS

Heredity classification	Number of cases	Percentage
Group I	36	30.5
Group II	18	15.1
Group III	64	54.2

TABLE 5

EEG AND HEREDITY—TOTAL POPULATION

	Heredity classification					
	I		II		III	
EEG classification	#	%	#	%	#	%
Group I	6	17	3	17	8	12
Group II	2	6	2	11	2	3
Group III	7	19	2	11	9	14
Group IV	11	30	5	28	19	30
Group V	10	28	6	33	26	41

Table 6 shows analogous data after excluding from the total group studied in this paper the patients having a personal history of a definite neurological disorder. It can be concluded from this table that there are relatively more patients with normal EEG's in the population with a negative family history than in the population with mental conditions in the family. In patients with a history of serious mental conditions in the family, the number of tracings with severe slow abnormality is half of that of perfectly normal records. This ratio is 1 to 8 in patients with a negative family history.

The data given in Table 6 were subjected to statistical analysis in a number of ways by means of the chi-square technique. For example, the relative in-

cidence of EEG Type I and EEG Type V in the groups with positive and negative heredity; of EEG Type I plus EEG Type II and EEG Type V in the same groups, etc. In all of these instances a relationship was demonstrated which could have occurred by chance not more than 7 to 9 times in a hundred. According to rigid statistical criteria, a relationship which cannot occur by chance oftener than 5 times in a hundred can be accepted as demonstrated. Hence our data approach statistical significance.

Figure 1 shows the percentages of different types of EEG's for two opposite groups of patients selected according to their family history. This figure illustrates the data found in Table 6.

TABLE 6

EEG AND HEREDITY AFTER ELIMINATION OF NEUROLOGICAL CASES

EEG classification	Heredity classification I #	I %	II #	II %	III #	III %
Group I	5	15	3	17	3	6
Group II	2	6	2	11	2	4
Group III	6	18	2	11	7	13
Group IV	10	30	5	28	17	32
Group V	10	30	6	33	25	46

DISCUSSION

It appears therefore that in the genesis of abnormal EEG patterns of young mental patients, heredity may play a definite role. An attempt to correlate the diagnosis of the examined patients with the hereditary factors failed to bring any additional information. This may be due to the relatively small number of cases. The result of this study is important from a theoretical point of view because it substantiates the significance of hereditary factors in mental diseases. From a practical point of view, it shows that electroencephalography may be one of the tools for detecting the presence of these factors in each individual case. When an abnormal EEG is found in a young individual without any definite history of somatic disease, hereditary factors should be carefully investigated. Conversely, when an apparently normal individual is known to have a positive hereditary background, the presence of an abnormal EEG should suggest the necessity of medical observation. Thus the findings of this paper may have an importance for mental prophylaxy.

SUMMARY

Electroencephalographic examinations were performed on 118 patients aged between 13 and 23 years, suffering from all types of mental disease. Thirteen of these patients had a personal history of a neurological disorder. These patients were classified in different groups according to the presence and importance of the abnormal hereditary factors.

There are relatively more patients with normal EEG's in the population with a negative family history than in the population with mental conditions in the family.

Both the theoretical and practical significance of these findings is stressed.

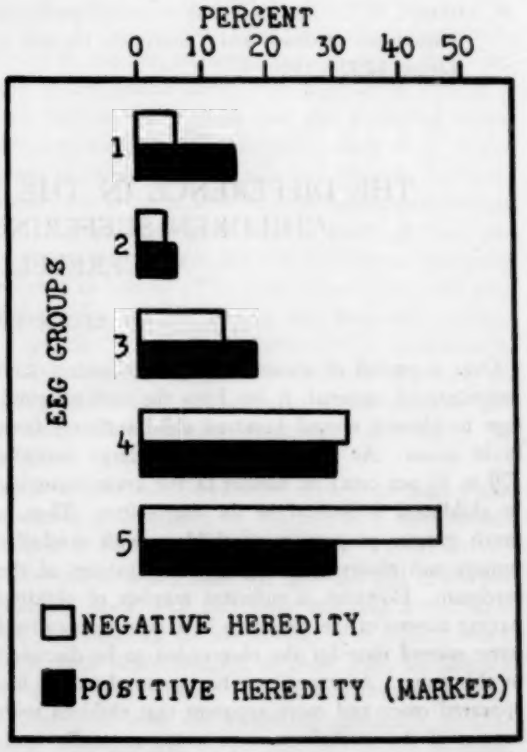

FIG. 1. EEG group 1: severe slow abnormality; group 2: severe fast abnormality; group 3: moderate abnormality; group 4: borderline records; group 5: normal records.

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THE DIFFERENCE IN THE MENTAL REACTION BETWEEN CHILDREN SUFFERING FROM CEREBRAL AND CEREBELLAR TUMORS

LEO M. DAVIDOFF, M. D.

Over a period of about 20 years in contact with neurosurgical material, it has been the author's privilege to observe several hundred child sufferers from brain tumor. As is well known the large majority (70 to 80 per cent) of tumors of the brain occurring in childhood is located in the cerebellum. Thus, a much greater proportion of children with cerebellar tumors was observed than those with tumors of the cerebrum. However, a sufficient number of children having tumors of the cerebrum have been seen to lend some control data for the observation to be discussed in this paper. As experience has accumulated, it has appeared more and more apparent that children with tumors of the cerebellum seem to be unusually intelligent, attractive and sweet dispositioned.

One of the most striking examples of this tendency that I can recall was in a small boy of 10 years who was operated by Dr. Cushing January 2, 1926 for a cerebellar medulloblastoma. This was a child of a poor Southern family which stretched every resource to the breaking point to bring the child and his mother to Boston. The particular type of tumor from which he suffered is extremely malignant and, even after radical surgical extirpation, it rapidly recurred. He was, therefore, returned to Boston suffering severely from headache, nausea, vomiting and failing vision, and was eventually reoperated upon. The character of the child can be best illustrated by quoting a post-operative note by Dr. Cushing: "This little boy is a perfect marvel. He has waited around for a couple of weeks while I was trying to clear my slate and incidentally trying to make up my mind whether I was justified in going in again. Yesterday, he told me that if I didn't hurry up and operate on him he was going home because his mother was getting nervous. This morning I told him I was going to see what I could do with him without ether because J. H. (another small boy with the same condition—equally marvellous) had had his operation without ether; and he didn't utter a whimper during the 2½ hour performance, not even asking if I were through. Then when I was beginning to close the wound, he thanked me politely for sending word to his mother that we were nearly finished." A later letter from his mother said: "We reached home the last of February and he passed away April 7th.—He suffered great pain all the time but was as cheerful and patient to the end as he was all the way through."

It would naturally be very easy to fall into the error of remembering a striking example such as this and generalizing on the basis of insufficient data. An attempt was, therefore, made to review a series of cases with an effort to gain some information concerning the mental make-up and temperament of these children as noted in their medical records. Unfortunately, the temperament of a patient in organic neurological and neurosurgical clinics is not subjected to too serious scrutiny. The data obtained from these records were, therefore, fragmentary and unorganized and had to depend on the casual observations occurring in the nurses' notes and the declaration of the surgeon and his assistants as to the cooperativeness of the child under trying conditions. An attempt was made also to look into the social background of these children in order to allow for hereditary and environmental factors which could obviously influence the results.

Actually, about fifty cases of children with cerebellar tumors and twenty with supratentorial neoplasms

were reviewed. However, the data were found too incomplete to permit of statistical studies and, at the completion of the investigation, only impressions remained but these were distinctly in favor of the original viewpoint.

CEREBELLAR TUMOR GROUP

Because of the early obstruction to the cerebrospinal fluid circulation by tumors of the cerebellum, these children are usually extremely uncomfortable. Headache is particularly severe. Vomiting is frequent, often seriously interfering with nutrition. Dizziness is common. Blurred vision, diplopia and failing visual acuity are characteristic symptoms. Unsteady gait often results in falls and bruises. Yet in spite of these discomforts, the children call forth the admiration of the hospital personnel. One frequently reads: "Even though this child is but eleven years old, he was operated under local anesthesia and cooperated extremely well." A nine year old girl, one of four children in a poor Italian family, is described as alternately drowsy and alert. During her waking moments she "shows better than average intelligence, is soft spoken, very bright, very cooperative and shows very good insight." A nine and a half year old boy of poor Jewish parents complained of headache, vomiting and failing vision. In spite of his suffering, his record declares "he is pleasant, friendly, very cooperative. He is mentally precocious with a mental grasp above the average intelligence." Ventriculography was done under local anesthesia, and the operator noted "the boy gave excellent cooperation."

Even patients of much earlier age than those above quoted seem to show similar dispositions. A two and a half year old baby, one of seven children from a poverty-stricken Polish family, was brought into the hospital with headache, vomiting and unsteadiness of gait. In spite of her discomfort, she became almost immediately the pet of the ward. At first she was quiet and somewhat frightened in the hospital but within a few days after admission a psychological test gave her an intelligence quotient of 131. She was described by the psychologist as a child of superior intelligence who seemed to enjoy the tests, paying good attention without loss of interest.

In the majority of instances the information is much more meager, but, with very few exceptions, the descriptions read "acutely ill, but good cooperation," "apathetic, but intelligent, cooperative, sweet dispositioned child," "cooperative and intelligent," "friendly and fairly cooperative," or simply "good cooperation." The record of one child of 4, the son of an Irish railroad laborer, who must have been extremely ill, contained a note by the author, "Hydrocephalic head, extreme ataxia, papilledema of *10 D. O. U.*, dehydrated, general condition very poor, *but seems to want to cooperate.*"

SUPRATENTORIAL TUMOR GROUP

The group of cases of children with tumors above the tentorium is, firstly, smaller in number and, secondly, much less uniform in character than the first group. A considerable proportion of supratentorial tumors in children are congenital suprasellar cysts, two cases in the present series were pinealomas, thus in a sense extracerebral tumors, and also producing secondary hydrocephalus. Furthermore, since it is in the nature of childhood to be soft and unspoilt, one occasionally sees children with cerebral hemispheral tumors with angelic dispositions. The majority of these patients, however, behave like sick children are normally expected to behave. The notes referrable to this particular point, meager as they are, frequently contain the words "irritable," "uncooperative." Occasionally, a fuller note such as the following one describing an eight year old boy with a frontal tumor appears, "unpleasant, uncooperative, emaciated, chronically ill child."

One of the most impressive experiences that I can remember is illustrated by the case of a child which deserves to be quoted.

The patient was a little 4½ year old girl of French Canadian stock who had been suffering from headache and vomiting for six months. She was admitted to the Beth Israel Hospital of New York on January 26, 1934. Her illness began after recovery from chicken pox, and the symptoms gradually became worse until she had to be admitted to the hospital. Examination showed a poorly nourished, crying, irritable, uncooperative child making careful neurological examination almost impossible. In so far as this could be carried out, she showed a somewhat enlarged head with dilated veins of the scalp and a positive cracked-pot sound (Macewen sign). There was a mild degree of ataxia in both upper extremities, generalized hypotonia and slight nystagmus to the left. There appeared to be also a slight increase of the deep reflexes on the left side with a positive Babinski sign on the left and a possible left central facial paresis. Papilledema of 3 D was present in each eye.

In spite of the left pyramidal tract signs which might have been explained by indirect pressure upon this structure as it passes through the brain stem, it was agreed that the most likely diagnosis was tumor of the cerebellum, probably medulloblastoma.

On January 27, 1934, a suboccipital exploration revealed a normal cerebellum, although a moderate degree of internal hydrocephalus was proved to exist.

Her recovery was slow. She continued to be irritable and sick. On February 23, 1934, when her condition at last permitted, an encephalography was done revealing a large right frontal cerebral mass. A few days later a right frontal craniotomy was done and an ependymoma 7 x 5.5 x 3.1 cm. was removed from the region of the superior and middle right frontal convolutions. The child made an uneventful recovery, and at the time of discharge her disposition had remarkably improved.

It is undoubtedly true that a large factor in the wrong localization of the tumor in this child was the underestimation of the mild, though definite pyramidal tract signs. On the other hand, the headache, vomiting, hydrocephalus, ataxia and nystagmus, taken together with the laws of probability in so young a child that the tumor is most likely in the cerebellum, led us astray. However, had we been more alert concerning the unusual feature of irritability and lack of cooperation in a child with a cerebellar tumor sufficient doubt may have been cast on the localization to lead to the pneumoventriculography before the first, unnecessary operation.

COMMENT

The incidence of mental changes in relation to tumors of the cerebellum has been variously estimated, but in all reports it is granted that this is much smaller than that which occurs in association with tumors of the cerebrum. In a previous paper on mental symptoms among brain tumor patients, the writer (1) was able to state that psychotic manifestations other than apathy or drowsiness are unusual in association with tumors of the posterior fossa. Deery (2) reported two cases of tumor of the posterior fossa with visual hallucinations which he believed, however, to be due to indirect pressure through the tentorium on the calcarine area with interference with its blood supply. Southerland (8) reported only 2.3 per cent of 128 cases of verified cerebellar tumors which showed some form of mental impairment. Schuster (7), Kraepelin (5), Minski (6), Golla (3), all of whom had observed mental changes in cases with tumor of the cerebellum, nevertheless all agreed that these were much less frequent than in patients with supratentorial tumors.

Keschner, Bender and Strauss (4), who reported the highest percentage of mental changes in cases with tumor of the posterior fossa (47 per cent out of 120 verified cases) declared, however, that the incidence was only half that in their previously reported cases of supratentorial tumors. These authors believe that the high incidence of mental changes in their patients is due to the detailed psychiatric examination to which their patients were subjected as a routine. Furthermore, they grant that many of the mental changes are so slight that unless one searched for them with great care they could have escaped attention. The comments by these authors on the disturbances in affect is of interest in connection with the subject of this presentation. They observed emotional changes in 29 patients with posterior fossa tumors, 22 adults and 7 children. "The changes were slight and were not persistent. Euphoria was noted in 8 patients—7 adults and 1 child, 2 adults were facetious, 2 patients were both euphoric and facetious, and 4 patients manifested mild forms of depression, chiefly in the form of hypochondriasis. Several were unusually apprehensive. Eleven showed increased irritability, 3 of whom were children who cried excessively and had temper tantrums." They believed, however, that these symptoms were psychic reactions of the type frequently observed in patients suffering from any severe disease.

Nowhere in the literature was a reference found to the unusual cooperativeness, intelligence and sweetness of disposition occurring in so large a number of children with tumor of the cerebellum. On the other hand, numerous clinicians whose attention has been called personally to this manifestation have recognized it as a fact and looked for it in subsequent cases. It is obviously not a pathological sign and seems to stand in the same relation to tumor of the cerebellum as the recognized constitutional factors in such conditions as peptic ulcer or pernicious anemia. It seems unlikely, moreover, that these characteristics are produced by the disease, since they are not changed after the tumor is removed and the child cured. Indeed, in so far as inquiry has yielded evidence, it would seem that these children were always of this type, long before any symptoms of cerebellar tumor appeared.

The significance of the entire subject may be more apparent than real. In a life devoted to the practice of neurological surgery, practically the only children patients seen who do not have cerebellar tumors are those with cerebral tumors. Since the latter more frequently have positive manifestations of dispositional changes, the former may only appear angelic by contrast. In any case, the manifestation of good cooperation, a high degree of intelligence and a sweet disposition in a child with obvious signs of increased intracranial pressure is frequently in favor of the localization of a brain tumor in the posterior cranial fossa.

SUMMARY

It has been the author's observation that children harboring tumors of the cerebellum seem to be unusually alert, cooperative and sweet dispositioned. Based on this impression, a review of about 50 cases of such patients was made and while the information obtain-

able from the hospital records with regard to this point is not complete, it nevertheless appears to bear out that impression.

An additional group of 20 children with tumors above the tentorium seemed to respond to the situation of severe illness in the manner usually expected of severely sick children.

The explanation for the difference is not evident.

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THE RELATIONSHIP OF ANTI-SOCIAL TRAITS TO THE ELECTROENCEPHALOGRAM IN CHILDREN WITH BEHAVIOR DISORDERS

Captain JOSEPH J. MICHAELS, M. C.*

For a number of years, the author has been interested in the problem of persistent enuresis and its relationship to psychopathy (6). Recently he and Secunda (9) found that enuresis was the only neurotic trait that occurred in positive association with the presence of an abnormal electroencephalogram in 122 children with behavior problems. In this communication (9) attention was called to the danger of drawing conclusions from the correlation of a specific, relatively simple, graphic unit such as the electroencephalogram with a vague, qualitative complex—the behavior disorder syndrome. Inasmuch as data [1] such as stealing, setting fires, and sexual misbehavior, variables more specifically related to the behavior disorder entity were available, these were analyzed in relation to the electroencephalogram. The incidence of the factors investigated in 122 children were essentially the same in this smaller series as in the orginal series of 143 children reported by Secunda and Finley (9).

Table I shows the high incidence of stealing (51 or 41.8 percent) and sexual misbehavior (33 or 27.0 percent). Stealing occurred significantly more frequently among the male children ($+24.0 \pm 8.2$). Setting fires was reported in 8 or 6.6 percent, it occurred only in the boys. The general observation that fire setting is almost exclusively confined to male delinquents is borne out in the small sample, however, the difference $+9.0 \pm 16.8$ was not statistically significant.

All of the anti-social traits and other factors were associated in a positive manner with enuresis, although when individually considered, they did not attain a correlation of statistical significance (Table II). These figures were derived from four-fold association tables, *e.g.*, of 51 children who stole there were 18 or 35.4 percent among the 38 enuretic children, which is listed as per cent positive, whereas of the remaining 71 children who did not steal, there were 20 or 28.2 percent among the 38 enuretic children, which is listed as per cent negative. The standard deviation of the difference in percentages was obtained according to the usual formula, the difference in percentages and its standard deviation was $+7.2 \pm 8.5$. The positive association of enuresis with the anti-social traits and other factors lends weight to the view that enuresis is one of the most important indices of an ill-balanced personality. Whenever enuresis is found, it may be anticipated that other traits indicative of maladjustment will usually be associated with it in a positive manner.

When the relationship of each of the anti-social traits and other factors to the electroencephalogram is considered (Table III) it is observed that the setting of fires was the only single anti-social trait that was associated with the presence of an abnormal electro-

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[1] The data were derived from observations at the Boston Psychopathic Hospital and Department of Psychiatry, Harvard Medical School. The author is indebted to Major L. Secunda, M. C. and Dr. K. H. Finley for permission to make use of their original data.

encephalogram ($+9.4 \pm 4.5$) which verges on statistical significance. Even though stealing was the most frequent anti-social trait in this group, and although like electroencephalographic abnormality it was more common in males than in females (8), nevertheless it was the trait that was most negatively associated with an abnormal electroencephalogram (-4.4 ± 8.9); this negative association is however not of statistical significance. Sexual misbehavior was associated in a slightly positive manner ($+3.2 \pm 8.1$) but not sufficiently to be statistically significant. If there is a definite correlation of the abnormal electroencephalogram with children who have behavior disorders, delinquents and psychopathic personalities, then it might be expected that those traits which are characteristic of the individual with anti-social tendencies would be similarly correlated. But from the data just described, it is obvious that of the anti-social traits considered, setting fires was the only one which had a nearly significant positive correlation with electroencephalographic abnormality.

In contrast, enuresis and electroencephalographic abnormality had a postive association ($+17.7 \pm 8.4$) that was almost of statistical significance. It is revealing that enuresis, a psychobiopathic trait, which is reflective of a lack of control, should be associated with an abnormal electroencephalogram to such a high degree ($+17.7 \pm 8.4$), whereas stealing, a sociopathic trait more intimately related to the anti-social aspect of the behavior disorder, should be associated with the abnormal electroencephalogram in a negative manner.

Enuresis is one of the indices of a malintegrated personality and has its roots imbedded in the deepest layers (instinctual) of the personality. It is more reflective of a disturbed harmony within the personality, and less dependent upon cultural factors. The act of stealing is more related to sociologic factors, probably more dependent upon cultural influences. It is not so intimately related to the biology of the person as is enuresis. Given a psychopathic personality who has been persistently enuretic, one might expect that inasmuch as enuresis is a sign of deficient inhibitory control which permeates the whole personality, it would be easy for such individuals to be led astray because they would be incapable of inhibiting their anti-social impulses.

TABLE I

INCIDENCE OF ENURESIS AND ANTI-SOCIAL TRAITS IN 122 CHILDREN WITH BEHAVIOR PROBLEMS

	Total		Male		Female		Difference in percentage
	No.	Percent	No.	Percent	No.	Percent	
Enuresis	38	31.2	28	31.4	10	30.3	$+ 1.1 \pm 9.4$
Stealing	51	41.8	43	48.3	8	24.3	$+ 24.0 \pm 8.2$
Setting fires	8	6.6	8	9.0	0	0	$+ 9.0 \pm 16.8$
Sexual misbehavior	33	27.0	24	27.0	9	27.2	$- 0.2 \pm 8.9$

TABLE II

PERCENTAGE OF ENURESIS IN RELATION TO THE PRESENCE AND ABSENCE OF ANTI-SOCIAL TRAITS

	Percent present	Percent absent	Difference of percentages
Stealing	35.4	28.2	$+ 7.2 \pm 8.5$
Setting fires	37.6	30.6	$+ 7.0 \pm 16.8$
Sexual misbehavior	36.4	32.9	$+ 3.5 \pm 9.6$

TABLE III

ENURESIS AND ANTI-SOCIAL TRAITS IN RELATION TO THE PRESENCE AND ABSENCE OF NORMAL, BORDERLINE AND ABORMAL ELECTROENCEPHALOGRAM

	Normal EEG			Borderline EEG			Abnormal EEG		
	Percent present	Percent absent	Difference of percentages	Percent present	Percent absent	Difference of percentages	Percent present	Percent absent	Difference of percentages
Enuresis	27.3	32.6	$- 5.3 \pm 9.4$	15.4	35.4	$- 20.0 \pm 6.8$	39.7	22.0	$+ 17.7 \pm 8.4$
Stealing	45.5	40.6	$+ 4.9 \pm 9.9$	42.3	41.6	$+ 0.7 \pm 10.7$	39.7	44.1	$- 4.4 \pm 8.9$
Setting fires	3.1	7.9	$- 4.8 \pm 5.3$	0.0	8.3	$- 8.3 \pm 5.4$	11.1	1.7	$+ 9.4 \pm 4.5$
Sexual misbehavior	33.3	24.7	$+ 8.6 \pm 9.0$	15.4	30.2	$- 14.8 \pm 9.7$	28.6	25.4	$+ 3.2 \pm 8.1$

COMMENT

In view of the numerous reports (2, 3, 5, 10) substantiating the high incidence of abnormal electroencephalograms in children with behavior disorders, delinquents and psychopathic personalities, there is a danger of accepting too readily the conclusion that there is a one to one correlation of abnormal electroencephalogram and psychopathy. It is tempting to grasp at a concrete manifestation of illness which can be singled out as the most significant etiologic agent. One must ever bear in mind the false hopes engendered with the discovery of the spirochete in general paresis. This intensified the search for a specific organic agent in all psychoses and, although of great value in a certain illness of the brain, may not have had the most salutary effect on the development of psychiatric research.

Some of the studies (3, 10) on the electroencephalogram in psychopathic personalities revealed that the individuals had neurologic signs suggestive of cerebral lesion or histories suggestive of cerebral lesions or both. In these instances, it would seem more logical to relate the presence of an abnormal electroencephalogram to the neurologic disturbance of the cerebral lesions. The abnormal electroencephalogram might well reflect a dysfunction in the brain but one would not be justified in attributing the psychopathy to this disturbance. Clinical experience reveals that there are many patients with dysfunction of the brain who are not psychopathic. One must be cautious in attempting to bridge the gap between organic dysfunction of the brain and anti-social behavior in a specific person.

If, however, it is recognized that anti-social behavior is a symptom of a sick personality, then the complexity of the issues will not be overlooked. It has previously been suggested (7) that there is probably a special kind of psychosomatic disposition which permeates the delinquent individual, giving rise to specific individuations at biological and psychological levels. The serious delinquent has an ill-balanced personality (poor organization, faulty integration, and a dysfunctioning ego) with a disturbed equilibrium.

The question arises whether in this group of patients we may not be dealing with cortical dysfunction in individuals whose total configuration is somehow disjointed or disturbed, *i.e.*, individuals in whom there was a generalized malintegration with specific individual dysfunctions at the various levels of the personality. This might be reflected in cortical dysfunction of the brain, defective intelligence, disturbed emotional relationships, heightened neuro-muscular irritability, persistent enuresis, etc. In these malintegrated individuals, persistent infantilisms of both a physiological and psychological nature are found.

The author had occasion to consult H. Davis in 1942 concerning the electroencephalographic studies of delinquent boys reported by Jenkins and Pacella (4), who concluded that most delinquents have normal electroencephalograms and that when there is an abnormal electroencephalogram, an epileptic or "organic" factor is indicated. Davis (1) believes that the actual electroencephalographic findings in this study appear to be non-specific. They are less in degree than one would find in individuals with epilepsy and correspond more with the type of waves encountered in cortical dysfunction found in all varieties of abnormal brain conditions. It is a type of pattern which occurs in the general response of the brain to adverse conditions due to new growths, edema, interference with adequate blood supply, anoxema and post-traumatic conditions. The question arises as to whether such a general type of electroencephalographic pattern might be typical for the dysfunctions of the brain in the other reported studies.

With the type of diffuse disturbance that these individuals present, it seems that perhaps another factor might have to be considered. With the high degree of uninhibited responses such as impulsiveness, excitability, irritability and explosiveness, the cortical dysfunction permits release phenomena of a general character (impersonal factor). The final anti-social reactions are colored or even dependent upon the particular development of the individual personality, (personal factor) and the cultural influences. The specific disturbance in the brain may render possible the facilitation and accentuation of emotion-provoking relationships. The necessary checks and inhibitions for restricting reactions are somehow disturbed and inefficient in their functioning. In other words, the cortical dysfunction with its attendant release phenomena permits the development of a caricature of the individual's tendencies. At present, there are no data of an electroencephalographic nature to support this hypothesis of a possible correlation of lack of inhibition with cortical dysfunction.

CONCLUSIONS

1. In 122 children with behavior disorders, there was a high incidence of stealing (51 or 41.8 percent) and sexual misbehavior (33 or 27.0 percent). Stealing occurred most commonly among boys ($+24.0 \pm 8.2$).

2. Enuresis was associated in a positive manner with all of the anti-social traits and other factors although each in itself was not statistically significant.

3. Fire-setting was the only anti-social trait that was associated in a positive manner with electroencephalographic abnormality, almost attaining statistical sig-

nificance, $(+9.4 \pm 4.5)$. Stealing was the anti-social trait most negatively associated with electroencephalographic abnormality (-4.4 ± 8.9), in contrast to enuresis which was the trait most positively associated with the abnormal electroencephalogram $(+17.7 \pm 8.4)$.

4. Attention is called to the dangers of drawing conclusions from the relationship of a relatively simple, graphic record, the electroencephalogram and a vague complex, qualitative entity, behavior disorder syndrome.

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NOTE

Graduate Residency Training in Psychoanalysis and Psychosomatic Medicine

A Psychoanalytic and Psychosomatic Clinic for Training and Research has been established in the Columbia University Department of Psychiatry to be opened January 15, 1945. This Clinic, the first of its kind in the United States, is under the supervision of Dr. Nolan D. C. Lewis. Dr. George E. Daniels has been appointed Chief of the Psychosomatic Service. Additional appointments are: Dr. Sandor Rado, Clinical Professor of Psychiatry, Director of the Clinic and Chief of the Psychoanalytic Services for In-Patients and Out-Patients; Dr. David M. Levy, Assistant Clinical Professor of Psychiatry and Chief of the Psychoanalytic Service for Children; Dr. Abram Kardiner, Assistant Clinical Professor of Psychiatry and Chairman of the Seminar on Comparative Analysis of Cultures. The Clinic is located at the Columbia-Presbyterian Medical Center.

OBJECTIVES

1. Graduate residency training for qualified physicians in psychoanalysis and psychosomatic medicine.

2. Research in the field of psychoanalysis and psychosomatic medicine.

REQUIREMENTS FOR ADMISSION

1. Graduation from a medical school approved by Columbia University.

2. Completion of an internship of not less than one year in a hospital approved by Columbia University.

3. Completion of a personal analysis with an accredited psychoanalyst.

4. Approval of application by the Psychoanalytic and Psychosomatic Clinic for Training and Research, Department of Psychiatry, and by the Committee on Graduate Clinical Instruction of the University.

REQUIREMENTS FOR AWARD OF DEGREE OF DOCTOR OF MEDICAL SCIENCE

1. Completion of a period of residency training of not less than three years in hospitals and clinics recognized by Columbia University, not less than one year of which must be spent in the Psychoanalytic and Psychosomatic Clinic, Columbia University, such study to include:

(a) A systematic program of lectures and seminars.

(b) Supervised clinical work on the psychoanalytic service for out-patients, minimum six months; on the psychoanalytic service for in-patients, minimum four months; on the psychosomatic service, minimum six months; and, on the psychoanalytic service for children, minimum two months.

(c) Supervised psychoanalytic treatment (reconstructive technique) of selected patients.

(d) Attendance at case demonstrations and clinical conferences.

2. Written, oral and practical examinations in the theory and practise of psychoanalysis and psychosomatic medicine and the related basic medical sciences.

3. A dissertation on the clinical aspects of psychoanalysis or psychosomatic medicine.

FEES

The fees for the entire three-year course of graduate training, including application for the degree, total $1,580.

AMERICAN SOCIETY FOR RESEARCH IN PSYCHOSOMATIC PROBLEMS

Report of Activities

Annual Meeting

The third annual meeting of the society will be held on June 15th and 16th, 1945 at the Hotel New Yorker in New York City, prior to the annual meeting of the American Medical Association in Philadelphia. The program is tentatively scheduled as follows:

June 15th

9:30-12:30 Presidential Address, Roy G. Hoskins, M.D.
Fifteen-minute Reports on Psychosomatic Research
2:00- 4:30 Psychosomatic Aspects of Gastric and Duodenal Ulcer
5:00- 6:00 Business Meeting
7:00 Annual Dinner

June 16th

Brief Therapy in Psychosomatic Disorders
9:30 Formal Papers
2:00- 5:00 Panel Discussion
1. Hypnosis and Drug Therapy
2. Group Therapy
3. Individual Psychotherapy

Conferences

The following conferences have been held during October, November and December. Proceedings of these meetings will be published in full or abstract form in subsequent issues of the journal.

Conference of the Committee on Infancy and Early Childhood

Detroit, October 25th and 26th

Feeding of the New-Born
Chairman, Lawrence K. Frank
Panel Discussion, Dr. Clara Davis, Dr. Frances Ilg, Dr. Edith Jackson, Dr. Milton J. E. Senn, Dr. Benjamin Spock. This special meeting was planned as a panel discussion for supervisors of nursing in Departments of Obstetrics and Pediatrics.

Physiological and Psychological Factors in Feeding
Chairmen: Dr. Milton J. E. Senn, Dr. John C. Montgomery
The Incidence of Breast-Feeding in Detroit—Dr. G. M. Byington
Reactions of Mothers to Breast-Feeding—Dr. Howard Walser
Current Human Milk Studies—Dr. Icie Macy Hoobler
Discussion of Selection of Cases—Dr. Jean Pratt, Dr. B. M. Hamill
Case Report on the Breast-Feeding of Twins—Genevieve Trainham
An Important Psychological Factor in Breast-Feeding—Dr. Editha Sterba
Some of the Meanings of Breast-Feeding—Dr. John Dorsey

Attitudes of Women toward Pregnancy and the New-Born Baby
Chairman: Dr. Edward Liss
Panel Discussion, Dr. Benjamin Spock, Dr. Jean Pratt, Dr. Alphonse Bacon, Dr. Margaret Gerard. This special meeting was planned for obstetricians and pediatricians in Detroit for the purpose of reappraising present-day practices in the care of newborn infants.

Role of Emotional Factors in Determining the Course and Outcome of Pregnancy—Dr. Flanders Dunbar and Dr. Raymond Squier.

Conference of the Committee on Cardiovascular Disease

New York, November 30th

Physiological Studies in Heart Failure—Eugene Stead, Jr., M.D.
Physiological Mechanisms in Hypertension—Herbert Chasis, M.D.
Psychological Mechanisms in Coronary Occlusion—Jacob Arlow, M.D.

Conference of the Committee on Cutaneous and Allied Diseases

New York, December 13th

Psychogenic Factors in Allergic Disorders—Edward Weiss, M.D.
Physiological Contributions to the Problems of Allergy—Harold A. Abramson, Major, MC
Clinical Aspects of Allergic Disorders—Milton B. Cohen, M.D.

Conference of the Committee on Physiological Mechanisms and Animal Experimentation

New York, December 14th

Delirium—George Engel, M.D. and John Romano, M.D.

REPORT OF THE COMMITTEE ON ANIMAL EXPERIMENTATION

1943-1944

Members

Frank Beach, New York
Thomas French, Chicago
W. Horsley Gantt, Baltimore
Howard Liddell, Ithaca, N. Y.
Jules Masserman, Chairman, Chicago

Consultants

W. C. Allee, Chicago
Donald Hebb, Jacksonville, Fla.
Carl R. Moore, Chicago
Calvin Stone, Palo Alto, Cal.

Purposes: At a meeting of the Committee in New York on December 18, 1943, the following were selected as its objectives for the fiscal year 1943-44:

1. To enlist the active participation of leading research workers in the field of animal behavior.

2. To hold annual or semi-annual scientific meetings devoted to the presentation of animal investigations relevant to psychosomatic medicine.

3. To serve as a clearing-house for information as to the current research activities of its members, and to act as an agency for co-ordinated research projects mutually agreed upon.

4. To foster the publication of surveys of the literature, preliminary reports of research, and an annual review of the work of the Committee membership in the journal of Psychosomatic Medicine.

Scientific Activities: On June 10, 1944 the Committee held its first scientific session at the Institute for Psychoanalysis in Chicago. Dr. Frank Beach, Curator of the New York Museum of Natural History, read an exceedingly able and well-documented survey of the literature on the role of hormones in animal behavior. Unfortunately, space permits only the following .ief abstract of the paper and its discussion:

EFFECTS OF HORMONES UPON BEHAVIOR OF ANIMALS

FRANK A. BEACH

Secretions of endocrine glands have long been known to exert powerful influences upon the initiation and maintenance of many types of behavior in different animal species. In addition to playing an essential role in the normal, physiological functions of the organism, certain hormones appear to display direct and specific control over particular behavior patterns.

One general category of behavior which is most obviously affected by endocrine secretions is that of reproductive activity including courtship and mating. Preparation for egg laying or parturition and care of the young are also hormonally influenced in all vertebrate species. Behavior associated with habitat selection and seasonal migrations appear to depend in part upon chemical substances produced by the ductless glands. Spontaneous activity is hormonally controlled at least in part, as are a wide variety of homeostatic reactions (diet selection, nest building for temperature control, etc.).

Social behavior involving inter-individual reactions leading to dominance or submission, the establishment of social hierarchies, the display of territorial defense, and aggression are subject to marked modification by hormones.

In connection with intellectual activities such as those involved in maze learning and problem solution the influence of specific endocrine secretions is less well defined.

Not only do hormones affect behavior—environmental influences often influence the secretions of various endocrine glands, particularly the anterior pituitary. There appears to be a complex system of interaction between the nervous system and certain hormone-producing organs.

[The presentation was followed by motion pictures of bisexual behavior in female mammals, illustrating the general concept of bisexual organization in the central nervous system.

This paper, which includes an integrative review of several hundred studies in the field, will be published in full in the near future.]

Abstract of Discussion of Dr. Beach's Presentation

The Chairman (Dr. Jules Masserman): I am always rendered quite humble by the wealth of factual material at the command of top notch natural scientists, and am particularly awed by Dr. Beach's erudition in this regard. It is difficult to disagree with a man with so many facts at his finger-tips. I am sure we are grateful for his comprehensive, critical and evaluative presentation in a controversial field. May I call for discussion? Dr. Allee, would you care to begin?

Dr. Allee: I want to raise one particular problem in which I am much interested, and I do this hoping that there will be a frank expression of opinion and that all of the information present in the room may be brought out into the open.

In the work that Dr. Beach has effectively reviewed for us, there is a good deal of emphasis upon the fact that animals have both the female and the male pattern of behavior, and upon the further fact that there are both androgens and estrogens.

I have been much interested in the problem of how these two sets of inherited nervous patterns are played upon by these two sets of hormonal influences. In very brief, abrupt terms, it is the problem of hormone antagonism that I am bringing up.

Now, I know that there are many similarities between the sex hormones, similarities in chemical structure, simi-

larities in types of response, particularly tissue response, and some behavior response that they evoke. Also there are differences. For example, we have never failed in our flocks, when we implant testosterone propionate or when we inject it, to make a low ranking hen advance in rank. When we started out to do that, we never failed to make the Omega hen in a flock over into an Alpha hen within a period of two months' time with this androgen.

Using an estrogen, estradiol benzoate injections, we have never had any hen increase in social rank. We have had eleven cases. In two of those cases we had hens that declined in social rank following the injections of estradiol. In nine cases they remained the same. In the two cases where there was a decline in social rank, one of them may have been the result of what is aptly called a hormonal insult to the organism; that is, the dosage was so heavy, a milligram per day for thirty-odd days, that I think the term "hormonal insult" is what we were presenting that hen. Her behavior, the decrease in size of comb, and other types of behavior may have been the result of that heavy dosage. But in the other case where the hen went down in social order, she was receiving a very small dose—I don't know whether I have those notes here because I am playing this largely from memory and by ear—0.0025 mg. of estradiol daily, the smallest dose that we gave to any of our hens.

Dr. L. V. Domm: I am particularly interested in the observations made in reference to the dominance position following injections of either androgens or estrogens. It is, of course, now well known that in the fowl both androgens and estrogens are present in the female, the former being produced by the medullary component and the latter by the cortical component of the functional left ovary. It has also been known for a long time that the head furnishings (comb, wattles, and earlobes) in the hen undergo considerable growth prior to and during the early phases of the laying cycle, that the size attained is in general maintained during this cycle, and that, following cessation of laying, these characters become small and capon-like in character. We were able to demonstrate some years ago in our laboratory that this cyclic growth of headfurnishings in the hen was not the result of estrogenic activity, as had been supposed, but was caused by androgens. It is therefore evident that androgens and estrogens are present, probably in varying amounts, and active in the hen during the laying cycle, and that the two hormones have different and specific functions.

It would therefore seem that aggressiveness in the hen may not be due to estrogens as such, but rather to androgens which are known to be present at least during the period that the bird is sexually or reproductively active.

There is one other point I should like to make. We ordinarily regard hormones as intrinsic or physiological motivators. Testosterone definitely can be considered in this light for it is known to cause the animal to react in a fairly specific manner under given conditions.

I am wondering to what extent sexual motivation on the part of the male is due to extrinsic or exteroceptive stimuli. For example, how prominent a role does posturing, etc., on the part of the female, play in the sexual motivation of the male. Carpenter observed sexual behavior in male pigeons some months following castration when they were placed with posturing females whereas there was little or no response in the absence of this female behavior. I do not believe this phase of the problem has received the emphasis it merits.

Dr. Lewin: I am always struck by the similarity of the problems with which experimental biologists and psychoanalysts deal in regard to sexuality. This, by the way, is no unique observation of mine; for, if you remember, Professor Wheeler expressed himself to the same effect, saying that he could understand what psychoanalysts meant when they talked about instinct, whereas other psychologists seemed to him to be talking about statues rather than human beings.

If I understand Dr. Allee correctly, in the problem of "antagonism" zoologists are faced with the same question that analysts have had to meet in the mental life of their patients. There it arises in the form of a conflict between heterosexuality and homosexuality, whereas usually heterosexuality "represses" homosexuality. Freud, influenced by the views of W. Fliess, originally assumed an inherent bisexuality in every human being, without drawing any such specific corollary as that one component necessarily stands in opposition to the other. Freud later expressed his views on heterosexuality versus homosexuality in connection with the famous case of the Wolf Man. This was a severe obsessional neurotic, analyzed for many years, whose illness depended on the repression of a homosexual fixation. At a very early age he had observed parental intercourse. Freud pointed out that whereas his identification with his father, due to the stimulating effect of the scene, was lived out, the patient's wish to find himself in his mother's place was opposed. It was opposed not by his heterosexuality, however, but by his fear of the imagined consequences of such an event. His heterosexuality did not repress his homosexual wish; the motive for repression was fear.

In other words, the idea of "antagonism" has found only a loose application in psychoanalysis; we should prefer to use environmental concepts, such as intimidation, seduction, frustration, etc., to describe some of the shifts that we find between homosexuality and heterosexuality, and to explain the vicissitudes of the sexual component in man. Heterosexual and homosexual usually appear as alternate possibilities and not uncompromising opposites—certainly in the unconscious mental life—each with its own capability of environmental transformation.

Antagonism, therefore, would seem to us a first descriptive approach rather than a general principle.

Dr. Beach: First, let's agree upon a definition of androgens and estrogens. I will propose one and, unless you have some serious objection, we will work on that basis. Let's define androgen as a substance which produces androgenic effects at a dose level lower than that at which it produces any other effect; and estrogen produces estrogenic effects at a dose level lower than that at which it produces any other effect.

We can administer these substances in hyper-normal doses and perhaps obtain pharmacological effects rather than physiological.

Let's consider androgen and estrogen on the low dose level basis. The specificity of hormonally-influenced be-

havior, to my mind, should be referred to somatic specificity, specificity in organization of the sensory-motor mechanisms. The movies which you have just seen might be said to illustrate antagonistic behavioral patterns. I simply mean to say that it is a physical impossibility for an animal to exhibit both female and male behavior at the same instant. In the neurophysiological sense there may be competition for the final, common path; but one or the other path must be dominant temporarily. In my opinion that is the full extent of any antagonism.

Male animals can be induced to show female behavior. They will do so when injected with estrogen, but the effective dose is much higher than that needed to bring about the same response in the genetic female. Males can also be stimulated to show feminine responses under the influence of androgen, but in this case the amounts of hormone necessary are very large. Spayed female mammals will exhibit receptive behavior under the influence of either estrogen or androgen; but the response is elicited more readily and at a lower dose level if estrogen is employed. Apparently in both sexes there exist essential somatic mechanisms for male or female behavior. In the male the masculine pattern is stimulated much more easily than is the feminine pattern. A difference in thresholds is indicated. In the female of most species the feminine pattern exhibits a lower threshold than does the masculine pattern. The male rats shown in the movie exhibited feminine responses because they had been injected with very large amounts of androgen. The female pattern in the male may be stimulated by androgen as well as estrogen but, since high doses of androgen are necessary, it would appear that the female mechanisms are much less responsive to androgen than to estrogen. It would appear that there is some sort of a positive relationship between the sex of the pattern and the sex of the hormone regardless of the sex of the organism. It seems to me that we shall have to discard any concept of antagonism in the behavioral effects of hormones since it can be shown that the same hormone can motivate either type of behavior alternately. The antagonism, if it exists, must be referred to somatic organization.

The importance of stimuli from the external environment should be stressed. I believe that as a general rule exteroceptive stimuli are of major importance for those vertebrate species in which the male customarily assumes the aggressive role in mating. This correlates rather neatly with the fact that in these same species the cerebral cortex is extremely important to the male's effective response. At the same time there is reason to believe that for the type of animal which we are considering the stimulus that arouses the male is not unisensory; but rather a complex pattern involving several different sensory modalities. Taken together with observations regarding the importance of the neocortex this fact would seem to indicate that the cortex may make its contribution in integrating the perceptual organization of the multisensory stimulus.

In many species it appears that the female's sex response depends upon a much simpler type of stimulation. In the rat, for example, the essential stimulus would seem to be nothing more than heavy pressure on the back and sides. It is interesting to note the correlation of this fact with those experiments which show that removal of the cerebral cortex in the female in no way interferes with mating ability. This same sexual difference appears to hold for the cat.

Dr. Domm: I am glad to hear your comments and must confess general agreement. In my opinion we have been inclined to overemphasize the importance of intrinsic motivation and to assign a minor role to extrinsic factors or, in some instances, to even disregard them. I think this has been unfortunate since your observations clearly emphasize the importance of the latter.

Dr. Beach: They don't, even in the female. Many factors contribute: the external environmental situation, the innate organization of the nervous system, and the hormonal level. When mating occurs, many additional stimuli are applied and progressively increase the excitatory state.

Dr. Gerard: Dr. Beach's presentation, as in the past, has stimulated me to a great many questions. Maybe a few of them will be of interest to the group. In the first place, I am surprised at Dr. Domm's doubts on this last point, else why are Varga and other pin-up girls so important to the world?

Dr. Domm: I have no doubts on the matter, Dr. Gerard. I was emphasizing prevailing rather than personal opinion.

Dr. Gerard: May I also make one further comment on this question of hormone antagonism in response to Dr. Allee.

You, Dr. Allee, were explicitly referring to antagonism in the sense of one hormone breaking down mechanisms or structures in relation to the other, from Moore's work particularly.

I should think that, if one takes the broad question of hormone antagonism, there is a good deal of positive physiological evidence that it does exist.

Let me merely remind you of the fact that one hormone in the body prevents diabetes and another hormone in the body produces diabetes. They clearly act antagonistically in the behavior of body parts. There is no reason that a similar antagonism could not exist on action on the nervous system and, therefore, ultimately on behavior. There are neural antagonisms on the autonomic and parasympathetic nervous systems. The whole body is built on a system of checks and balances, as it were. So, in that sense, I think one would have to agree that antagonism does exist.

In the sense of mutually destructive antagonistic relations, I think your point is very important. Probably that is what you meant.

May I also raise or underline another point that Dr. Beach certainly implied and, perhaps, said explicitly. I have been impressed all the time I have worked with the central nervous system with the fact that it is not an organ. Not only are there regional functional differentiations but there are, equally certainly, regional chemical, metabolic and response differentiations. So that the question is not merely do these things act upon the nervous system but upon which part; and what are the reasons that make it possible for a particular substance to act in one direction on a very small region of the nervous system and, perhaps, in an opposite direction on another closely adjacent part of the nervous system?

This question of metabolic specificity, I think, is of paramount importance in the further analysis of these problems. One specific question that occurred to me earlier, concerning the frogs mating reflex, has not, to my knowledge, been recently worked with experimentally. As you know, the male frog develops an intense reaction from stimulation of the pads of the forelegs which causes and maintains flexion, clasping the female or clasping any other object. That reflex is maintained by a "ring of frog" including that region of the spinal cord and the two arms, and nothing else. Similar exaggerated flexor responses do not occur anywhere else. It seems to me it is an admirable preparation for getting at the question of what happens locally in the cervical region of the spinal cord under the influence of the male sex hormone.

I would like to ask two questions, Dr. Beach. I would like your reaction, in view of present knowledge, to the findings that came from Pavlov's laboratories some years ago that castrated dogs were all disturbed in their conditioning reactions, didn't condition as well, and tended to break down their responses. If that is confirmed, is it a matter of learning and, if not, how would you interpret it?

The other question, to throw this back into the psychological and sociological field: I have often wondered, especially when I have heard Dr. Allee talk about social status in sub-human groups under the influence of hormones—the fact that some testosterone propionate can bring the under-dog or the under-hen to the top hen—is there any evidence that the peck order is, at least in part, similarly determined in human social strata?

Dr. French: The question that I have in mind touches on the psychological evidence in this question of so-called antagonism between hormones. It seems to me that what Dr. Allee has said would indicate—I don't see how one could possibly avoid it—that, as measured by any particular bit of behavior, there would be antagonism. That is possibly part of the difficulty which is a terminological difficulty. If one pattern requires that the animal be dominant, and another pattern requires that the animal be submissive, then of course there will be antagonism with reference to dominance and submission between the two hormones.

On the other hand, possibly the concept of hormonal antagonism, that is rejected, is that one hormone tends to inhibit at the source and the other hormone stimulates. That would be an entirely different concept of antagonism.

In the psychological material that I deal with I find, and I am very much interested to know whether you find it at the physiological level, that sometimes there is an interference of pattern. That is, in our psychological material it seems to me that we very frequently find a breaking up of the pattern. Part of the male pattern and part of the female pattern will appear in the same behavior. You might compare that to the incoordination mechanisms in other fields; there is a sort of incoordination of pattern, where, instead of the male pattern or the female pattern taking the dominance, there sometimes is neurotic behavior. I would say it is almost the rule, that one gets a mixture of the two, so far as motivation is concerned. I would be very much interested to know whether there is a similar finding at the physiological level.

Dr. Liddell: I was interested in the notion of hormonal insult because I have been thinking along the lines of traumatic agents and what is traumatized in the field of behavior, where it is hard to imagine whether you are dealing with specific and definable neural structures or something more subtle at the physiological level.

In thinking of the rat, I read on one occasion a thesis which came from Murray's laboratory. I don't think it has been published. Dr. Beach probably knows of it. The facts were, as I remember, that the male pattern was put in a conditioning situation so, when the male approached the receptive female, he got a premonitory shock at closer and closer distances to the actual copulation and then, in cases, got shocks after copulation was completed. This had a very definite effect upon the copulatory behavior.

I was wondering, in passing, if it would be possible to heavily weight the male and female situation, so the male about to take the female part would think twice about it, with the electric shock being the "social deterrent."

Dr. Beach: In reply to Dr. Gerard's question about the male frog, let me point out that there is an out of season clasp which one can elicit by pectoral stimulation; but the clasp of the male in breeding season is much stronger. At the museum we have done work on the effects of injury to various parts of the brain upon these clasps. It will be published shortly.

The clasp reflex in these animals is not abolished by any type of brain injury but, various aspects of amplexus, such as release at the termination of oviposition depend rather strictly on a localized region which as I remember is the preoptic area.

Dr. Gerard: You mean it is not in the spinal cord region but goes higher?

Dr. Beach: I think so. I discussed this with Mr. Aronson who is doing this work at our laboratory, and he told me that he has come to the conclusion that there are definite hormonal effects on the reflex even though it is obtained out of season.

Dr. William C. Young: This problem of specificity of hormone action and the receptivity of the organisms to the hormones was first called to my attention in doing work on the lower mammals, guinea pigs first and rats next, and then, thirdly, on the chimpanzee.

When the guinea pig and the rat were studied, it was found, to begin with, that the mating pattern is fairly complex; that is, there is the ordinary mating response which is produced by one combination of hormones, and then there is the male-like behavior shown by the females, which is produced by a similar combination of hormones. Then there is the spontaneous running activity which Richter has studied so extensively, that is produced, oddly enough, probably by one of the metabolites of estradiol.

For these three parts of the mating behavior pattern, there are very definitely animals which appear to be normal with respect to two phases of the pattern but completely unresponsive as far as the third phase of the pattern is concerned.

I would judge that the difference—if I may refer to that as a difference between individuals, a basic, possibly a somatic, possibly a constitutional, possibly a genetic difference—of the same type certainly exists in the chimpanzee.

In Orange Park we had two animals which, as far as we could tell from the excretion of estrogenic and androgenic substances, from the character of the reproductive cycle, from the appearance of the ovaries following their removal and studied microscopically, were perfectly normal, and yet the animals were not known, with one exception, to present themselves for mating.

As I see it, that is, certainly, one of the most fundamental problems that faces us. What accounts for these differences in, we might say, receptivity, reactivity, sensitivity, responsiveness? I don't know what is the best word. But what is it that accounts for these differences?

The exception that I would take to your statement, Dr. Beach, is as far as I can tell, these differences occur all along the line, phylogenetically, certainly, starting with the rat and guinea pig. Certainly, they occur at the level of the chimpanzee.

Dr. Beach: I do not believe that you have contradicted anything that I said. I am well aware of the existence of the differences to which you refer. Your own studies and those of your colleagues illustrate this point nicely. As I recall your papers you found certain female guinea pigs which displayed vaginal estrus but which did not show heat behavior. When these animals were spayed and injected with estrogen and progesterone you found that the amounts of hormone necessary were in excess of the doses which had proven effective in the majority of individuals. To me this indicates extreme resistance in the nervous mechanism for estrous behavior. It is certain that the discrepancy between ovarian condition and receptive behavior grows greater as we consider animals from higher and higher levels of the phyletic scale. Furthermore, it is interesting to note that the importance of the cerebral cortex to many phases of behavior also increases in the higher forms. It is interesting to speculate that, in the female at least, sexual responsiveness has been progressively "encephalized" during evolution with a resultant partial emancipation from hormonal control. I leave you to draw your own conclusions from the observation that the importance of the cerebral cortex to the male's sex life is marked even in the lower mammals.

RESEARCH REPORTS TO THE COMMITTEE

In addition to the scientific session reported above, the following reports of research in progress have been received by the Committee:

Research Report: D. O. Hebb, Research Fellow, Harvard University and the Yerkes Laboratories of Primate Biology.

I am at present working on the definition of temperamental variations in chimpanzees, as preparation for analysis of the effects of cerebral damage on temperament. This work includes investigation of the adequate stimulus to rage and fear in anthropoids, of the behavioral cues which determine an observer's intuitive impression or judgment of emotions and other hypothetic central states, and of the significance of the distinction between emotions.

Research Report on a New Manifestation of Experimental Neurosis in Sheep and Goat: H. S. Liddell, Cornell Behavior Farm.

A brief account of the experiments now in progress at the Cornell Behavior Farm follows. During the past year our experiments on the motor conditioning of sheep and goats have led to the recognition of a new type of experimental neurosis which bears certain intriguing resemblances to conversion hysteria in the human subject.

The experiments about to be described were begun late in June and are being continued daily. In preliminary experiments briefly described in a previous publication (The alteration of instinctual processes through the influence of conditioned reflexes, *Psychosom. Med.*, **4**:390-395, 1942) a new conditioning régime was employed in which a telegraph sounder clicking for ten seconds was reinforced by a brief shock to the animal's foreleg. Ten of these tests were administered daily, separated by 2-minute rest periods. Shortly the animal exhibited difficulty in flexing the leg to which the shock was about to be applied and on some occasions attempted to raise the stiffened limb from the platform on which it stood by movement from the shoulder. In the present series of experiments, of the 7 animals (4 sheep and 3 goats) tested daily according to this rigid time schedule, two of the goats and one of the sheep developed, in much exaggerated form, the motor disorder just described in the use of the fore-limb, and the remaining goat and another sheep are now exhibiting clear premonitory signs of the neurotic rigidity of the trained limb now so prominent in the two other goats. Furthermore, the disorder appeared in the two goats before any detectable abnormality was perceived in the sheep.

So insidious is the onset of this type of neurosis that the first signs of awkwardness of movement in the foreleg made their appearance in the most susceptible goat only after three months of daily training (740 conditioned stimuli). A chronology of the onset of the signs of this disorder in one of the goats will serve to characterize this type of experimental neurosis both for goat and sheep.

In goat #29 training according to the rigid time schedule described above was begun on July 20, 1943 with 10 tests per day. Until November 10 the heart rate during the rest intervals varied between 90 and 100 beats per minute. No significant changes having been noted in the animal's behavior up to September 27, the number of daily tests was increased from 10 to 20. The resting heart rate began clearly to decrease on November 11. On November 17 the goat first resisted being brought to the laboratory and refused to eat while its harness was being adjusted, and on November 19, at the 740th signal, stiffening and awkwardness of movement of the left foreleg was first observed. Difficulty in moving the conditioned leg gradually increased from this time onward and sometimes one, but sometimes both, forelegs remained stiffly extended at the end of the daily test. Shortly thereafter one or both forelegs was observed to be rigidly extended while the animal was being prepared for the experiment and, when pressure was applied to the foot of the stiffened limb, the limb resisted flexion, the resistance suddenly giving way as in the clasp-knife phenomenon.

Meanwhile, movement of the head, even during the conditioned signal, gradually disappeared and was replaced by a rigid posture of head and neck. The animal typically

stared straight ahead during the tests and the eyes slowly close, to be opened and then slowly closed again.

By December 30, the 1040th tests, the resting heart rate had dropped to 70-80 beats per minute, increasing 4 or 5 beats per minute during the signal, but sometimes not at all, or even showing a slight decrease preceding the shock. During the tests of December 17, after 980 signals, goats outside the laboratory pounded on the laboratory door with their horns. The goat in the Pavlov frame reacted to this unexpected sound by a slow, awkward flexion of the trained foreleg. One of the experimenters has assumed the role of a menacing figure, entering the experimental chamber only to startle the goat by making clucking sounds, or by pointing or clapping the hands. On recent occasions, at his appearance, the goat exhibits this same abnormal startle response, slowly and awkwardly flexing and extending the foreleg one or more times. The same abnormal startle pattern is given in response to the unexpected sound of a movie camera or the turning on of the bright lights for moving pictures.

As previously mentioned, the forelimb was at first found rigidly extended at the completion of the daily tests, then as the harness was being adjusted at the beginning of the day's experiments, but finally, on January 21, after 1260 conditioned stimuli, the goat, when released from its harness, was observed to limp on the stiffened left foreleg as it ran through the laboratory door into the pasture. This limping of the stiffened left forelimb as the animal leaves the laboratory has now been observed in the sheep as well as the goat and is of frequent occurrence.

Another sign of the experimental neurosis just described was first noticed on November 30 at the end of 840 conditioned signals. On this occasion the goat urinated and defecated when, after avoiding the experimenter, it was finally caught in the barn, and from this time on has not voided in the experimental frame as the animal with the agitated experimental neurosis regularly does.

[These results were illustrated in a colored motion picture film presented by Dr. Liddell at a joint informal meeting of the Committee and the Society on June 11, 1944 at the Stevens Hotel, Chicago.]

Progress Report of Research on Neuroses and Alcoholism: Dr. Jules H. Masserman, University of Chicago.

Alcohol and Normal Behavior: In recent experiments cats were trained to open a box for food, then to feed only after specific sensory signals and finally to activate those signals at will by manipulating a switch placed in various positions or behind barriers of increasing difficulty. When alcohol was administered these behavior patterns disintegrated and disappeared in the order of decreasing complexity of adaptation until only the original, primitive feeding reactions remained.

Alcohol and Neurosis: After recovery, the animals were subjected to a severe motivational conflict between hunger and fear, and developed manifestations of anxiety, inhibitions, phobias, compulsive behavior, "psychosomatic" and motor disturbances, loss of group dominance and other "neurotic" abnormalities. Small doses of alcohol (0.5 to 1.2 cc/k) again disintegrated these complex reactive patterns, alleviated the manifestations of anxiety, restored earlier goal-orientations and thereby temporarily relieved the neurosis. Some animals then developed a preference for alcoholic rather than non-alcoholic drinks until their "addiction" was cured by the relief of their underlying neurosis through the use of various therapeutic techniques.

Alcohol as a "Preventative" of Neurosis: Preliminary experimental findings indicate that a normal animal given 0.8 to 2.0 cc/k of alcohol does not develop as severe a degree of neurosis when subjected to an acutely conflictful situation as does a non-intoxicated animal; sometimes, indeed, the alcoholized animal is almost immune to conflict. These experiments are now being further controlled and extended.

Motion Picture Films: The work in our laboratory on the physiology of emotion, experimental neuroses, group relationships and the psychosomatic effects of various drugs is being recorded in motion picture films to be distributed for research and teaching purposes.

BUSINESS SESSIONS

A meeting of the Committee on Animal Experimentation was held in Chicago on June 10, following the joint conference with the Committee on Physiological Mechanisms which discussed the role of endocrines in animal behavior. Present were: Dr. Jules H. Masserman, presiding, Dr. Frank A. Beach, Dr. Thomas M. French, Dr. Howard S. Liddell, and Dr. Ralph Gerard.

Dr. Masserman read the annual report of the Committee and the report was accepted as read.

The question of increasing the membership of the Committee was discussed. Dr. Gerard said that it was his feeling that the Committee on Physiological Mechanisms and on Animal Experimentation were so close in fields of interest that it might be wise to merge the two Committees. The further point was made that the war emergency made frequent meetings difficult and that such an amalgamation might help meet this problem. Dr. Beach moved to submit this proposal to the Committee on Psychosomatic Research for approval. The motion was seconded by Dr. Liddell and unanimously carried. It was decided that Dr. Masserman would consult with Dr. Gerard as to another conference in the early winter.

In July, 1944 the Committee on Psychosomatic Research of the Society approved the merger of the Committee on Animal Experimentation with the Committee on Physiologic Mechanisms under the co-chairmanship of Dr. Ralph Gerard and Dr. Jules Masserman. The chairmen have since planned a December meeting in New York, with the program, to be devoted to a discussion of work on delirium by Dr. John Romano and his associates.

This report then, is the swan song of the Committee on Animal Experimentation as a separate entity. Its members—and certainly its ex-chairman—look forward with personal pleasure and scientific relish to collaborating with their colleagues in other fields on the neonate Committee on Physiology and Animal Experimentation.

Respectfully submitted,

JULES H. MASSERMAN,
Chairman

PSYCHOSOMATIC FACTORS IN PRURITUS †

MILTON ROSENBAUM, M.D.*

Pruritus vulvae is a distressing and common symptom. Dermatologists and gynecologists who are usually called upon to treat this condition have long recognized that the pruritus is not often a disease entity in itself but more frequently a symptom and sign of either a generalized or focal bodily disease. The symptom may appear as a reaction to local infection or irritation of the genitals, to a glandular disturbance (ovarian or other endocrine dysfunction), or it may be present in the absence of "lesions" either focal or general, being then labeled "idiopathic pruritus vulvae." As in many other so called "idiopathic" diseases the etiological agent is usually psychogenic. It is with this type of pruritus that this paper will be concerned.

It is well known that the sensation of itching with its resulting scratching may result in pleasant and sensuous sensations at times actually culminating in sexual orgasm, while at other times (or at the same time) these symptoms may produce intense suffering with violent scratching so that the end result almost amounts to complete self-destruction ("tearing one's self to pieces"). These reactions are not limited to pruritus vulvae but may be seen in any type of pruritus with or without lesions. The most common example of this is seen in ring worm infections of the feet and pubic region in which the itching and scratching can call forth both types of emotional responses. Stokes (2) cited the case of an elderly gentleman who refused treatment of his ring worm with the frank remark that it resulted in more pleasant sensations than sexual relations with his wife. In this naive statement rests a great deal of truth, since it points clearly to the masturbatory element in many cases of pruritus, while the "masochistic" element is inherent in the concomitant suffering and pain.

Since the neurotic symptom which combines elements of both pleasure and pain is classically the hysterical conversion symptom, it is understandable that many patients who suffer from pruritus of the vulva have clear cut hysterical personalities (1). By these statements I do not wish to imply that all patients with pruritus of the vulva or with psychogenic pruritus of any type are hysterical since the symptom of pruritus itself may occur in various types of personalities and in various psychiatric syndromes. Intense itching and scratching may be seen in patients suffering from depressions, in schizophrenics, and in the so-called "character neurosis." In these conditions the hostile and aggressive elements of the pruritus are more intense and more outstanding than the sexual components and by the mechanism of "turning-inward" of the aggressive drives the self-destruction (scratching and tearing) takes place. The two cases to be cited will illustrate the various factors involved not only in pruritus of the vulva but in pruritus in general.

Case 1. The patient was a 39 year old married woman who was referred for psychoanalysis because of short periods of depression during the past few years. In the past year the depressions were more intense and usually associated with the menses. During these times she was irritable, nasty, "makes life miserable for her family," and although there were no definite suicidal ideas or impulses she often thought she would be better off dead. She was an extremely tense and unhappy woman and characterized herself as a "real bitch." There were many compulsive traits in her personality in that she was overly conscientious, a meticulous housekeeper, very strict about money matters, and in her own words possessed the world's most "biting tongue." She was frigid sexually and the menses were abnormal, the periods being characterized by a scanty flow. Despite obvious difficulties in her relationship to her husband and her family, she had many friends who apparently were genuinely fond of her, and she played an active and able role in community affairs.

She was a middle child with a sister one year her senior and a brother a year and a half younger than she. The sister was attractive, popular and cheerful while the brother was a highly intelligent and able person who became quite successful in his father's business, and after the father's death became the sole owner.

The father, who died in 1938, was a charming although homely man, who was extremely popular and well liked by everyone in the community. The mother was an attractive woman, completely dependent and attached to her husband so that she continued to feel lost and helpless after his death. The parents were close to each other, and this the patient always resented.

The patient complained bitterly of her misfortune in being a middle child and an ugly duckling to boot who had inherited her father's homely looks and her mother's mean disposition. As a child she was quite sensitive and overly-good in her behavior and gave her parents no trouble except that she was frequently sick with gastro-intestinal upsets, especially vomiting. She was an excellent student and finished second in her class in high school, although strangely enough she failed her admission examinations for a well known eastern college. (Obviously she didn't want to leave home.)

Because her father promised that she could go to an eastern college she went to boarding school with her sister for a year but her father changed his mind and insisted

† Presented at Annual Meeting of American Society for Research in Psychosomatic Problems, Chicago, 1944.

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she enroll in a local university, which she did. While at the University she fell in love, and the affair lasted five years with frequent gratifying sexual experiences. Her family, especially her father, violently objected to her lover on the grounds that he was socially inferior and after her money. After a weak struggle to emancipate herself the patient again gave in to her father's wishes, broke off the affair and in this setting married her present husband, a weak and ineffectual person. Despite her unhappiness the marriage ran an uninterrupted albeit stormy course and the patient felt that she had to continue the marriage for the sake of her 13 year old son, an only child to whom she was completely devoted.

The beginning of the analysis was concerned with hostility and guilt towards the mother. She always considered herself a denied and unloved child but it became evident that in reality she had been overindulged and because of guilt had fantasied herself in the role of the unwanted child. It also became evident that she was an hysterical personality and that most of her symptoms were on the basis of an identification with the father on whom she was fixated and for whom she was constantly longing. As a matter of fact this intense (oral and sexual) longing for the father seemed to be the core of the neurosis.

As the material about the father emerged in the transference situation, she acted out a good deal and developed several transitory hysterical symptoms related to the fixation on the father and to the envy of the rivalrous mother and sister.

Around this time the patient developed vaginal pruritus which in a few days became so intense that she was undergoing marked suffering. Although she admitted that the symptom might be psychogenic she couldn't understand its seasonal nature—having occurred each March for the past four years (each March since the father's death). The patient stated she felt wild as if she was burning with fever and on the couch she was extremely tense and cried. She then related the following dreams:

(1) An incident in which she took someone's temperature—over 105°.

(2) Something to do with a wedding and a meal—a wedding breakfast—she was looking in and said these people were high society. Someone knocked at her door—she wasn't dressed and went to her closet and reached for a housecoat which was hanging on top of another garment. The underneath garment was a red dress.

The important association was an incident which happened eleven years before—in March, 1932. This was the last time she saw her college lover (two years after her marriage). She had invited him to visit her one afternoon and in preparation for the visit she put on a pair of red lounging pajamas. Shortly after he arrived in the apartment her father came in unexpectedly and went into a rage over the incident despite the patient's insistence that everything was above board. The patient also commented that her last menstrual period (March 1943) was the most profuse and normal she had ever had. At this time an interpretation concerning the sexual nature of the symptom and the reason for its seasonal (March) occurrence was given.

In the next hour the patient continued to complain of the pruritus and felt so miserable that she entertained suicidal ideas. She reported a dream which had to do with pregnancy. On the way to my office she had the fantasy that she could easily run into a pole but then she felt guilty for fear she might damage her car. (There were numerous previous dreams which revealed a clear connection between a car and her mother's body.) She brought out further feelings of envy towards her sister and mentioned that her sister always feared cancer and the patient thought that maybe she'd get cancer by scratching herself.

The day preceding this hour she learned that her mother wanted to go to Washington with her brother, who was going on Government business. When the over-crowded conditions existing there were pointed out to the mother, she said that she and her son could occupy the same room. This infuriated the patient and she immediately called on the brother insisting that her mother should not be allowed to accompany him to Washington. This incident mobilized the original wish to separate the parents and also the guilty aggressive wishes against the rivalrous mother and sister (fantasy of wrecking her car). The identification with her mother and sister with the aggressive impulses towards them turned inward because of guilt in the form of "tearing and scratching herself apart" was also pointed out. After these interpretation the vaginal pruritus disappeared.

The vaginal pruritus in this case revealed the classical psycho-dynamic structure of an hysterical symptom. The forbidden sexual wishes were gratified in part by the itching (masturbatory activity) and the concomitant emergence of pregnancy dreams and fantasies (she had felt nauseated and desired to vomit during this period) while the punishment was evidenced by her intense suffering and the violence of the scratching. In addition, the hostile and destructive wishes towards the mother and sister were satisfied by the mechanism of identification so that she "tore herself apart," as she had once wished to do to them.

Case 2. The patient was a 66 year old, handsome and charming widow, a professor of gymnastics in a midwestern college, who had suffered from pruritus vulvae and "burning in the bladder" for the previous ten years. She had been examined by many doctors and at many clinics and although no physical disease of the bladder or genitals had been demonstrated she underwent a barrage of local and general treatments (irrigations, ointments, X-ray, vitamins, etc.) without relief. Finally she was referred to a neuro-surgeon with the question of whether or not local nerve block should be done. It was during this hospital stay that I saw her. A complete physical work-up, including neurological, dermatological, and urological (cystometrogram) examinations were within normal limits.

The onset of her symptoms occurred about twenty years before, shortly after her husband's death, and was associated with the use of a filthy toilet in a railroad coach. Immediately after this experience, which was quite shocking

and upsetting to her, she rubbed mercury ointment into the external genitalia as a prophylactic measure and within a few days developed itching and dysthesias of these parts. These symptoms persisted for three years and finally were relieved by X-ray treatment. She was well until ten years before when the pruritus returned, this time accompanied by mild frequency and burning on urination. These symptoms continued to the time of this report. Interestingly enough these symptoms were more noticeable in the standing position. She said that she had developed a peculiar gait because she had to keep her thighs apart to allow for "better circulation."

In two interviews with the patient the following pertinent historical data were elicited:

The patient was born into a wealthy and refined southern family being the only girl with three older brothers. At the age of four her mother died during childbirth and she was raised by her grandmother. Because of the mother's death the patient developed a fear of pregnancy; she advanced this as the reason for remaining childless during her marriage. During her first eight years of life she was quite happy and lived in comfortable surroundings. At this time financial reverses set in and the family moved to dismal quarters in the city, and in order to make ends meet took in boarders. At the age of ten her father died and when she was fifteen her grandmother died. She then went to live with her aunt and uncle who had no children of their own. The uncle was a peculiar man, who was wrapped up in art and literature and had few outside social contacts, while the aunt was a beautiful and charming person. (At this point the patient mentioned her own beauty as a young girl.) The patient soon noticed that her uncle was quite fond of her and within a short time he fell in love with her. His behavior became so seductive that she never allowed herself to be alone with him and became quite fearful. In spite of the fact that her aunt and her brothers knew of the uncle's interest in her she continued to live with them until she graduated from high school—to avoid scandalous talk so she said.

The patient related many experiences during this period of her life, to illustrate the relationship with her uncle. At one time he proposed that they occupy a room in the slums of the city and live together in an artistic and spiritual relationship. (It is interesting that her illness broke out when she was exposed to a filthy toilet.) On another occasion she and a girl friend were at the theatre and her friend remarked that a man in a nearby box was observing them through opera glasses. She glanced up and the man was her uncle. She recalled that at that moment she got the creeps and while relating the incident to me she got "goose-flesh" and began to scratch her thighs. I pointed out the connection of the present scratching and the past incident.

As a result of the morbid situation and excess stimulation (the patient made no attempt to leave) she developed a dislike for men, became a tom-boy and vowed she'd never marry. (These feelings were probably related to the choice of her profession.) She emphasized her innocence in the affair but nevertheless she felt guilty towards her aunt and as a matter of fact supported this aunt in the latter years of her life.

After graduating from high school she left her uncle and aunt and lived with friends and continued in college. She never went out with a man until she met her husband who was a prominent young lawyer and later a judge. It was love at first sight and she was attracted to him for two reasons. One was that he like herself was morbid (her morbidity being her dislike of men—also her uncle was morbid) in that he was well on his way to becoming a severe chronic alcoholic, and the other reason was that a girl friend of hers was quite interested in him.

After a short courtship she married with the full knowledge that she would suffer in her marriage and that she did. Although she and her husband were in love with each other and although he had a successful career as a judge, his alcoholism continued so that he spent much time in sanitoriums and disappeared on many occasions while on alcoholic sprees. She was frigid sexually. After her husband died twenty years before she again reverted to her original man-hating and man-avoiding attitude. When I mentioned that she was relatively young when her husband died she remembered how upset she would become if anyone mentioned that she was an attractive widow and might remarry, and told how she had refused to even stay alone with a man (same reaction to her uncle) ever since. It was in this setting that her symptoms first developed.

After the history was obtained there was a general discussion of certain obvious and classical psychosomatic correlations and then the importance of the psychological factors in the patient's symptoms were emphasized. As the history itself unfolded comments were made regarding the connection of the symptoms with certain life experiences, the significance of which was obvious from the preceding history of the interviews. The patient seemingly accepted this approach and was undoubtedly aided in this matter by the reinforcement of similar views by the other attending physicians. She left the hospital with an opportunity to return for further psychotherapy if she so decided. To the patient's amazement (and mine too) the symptoms disappeared within a few days after she returned home, and she has remained free of symptoms up until the time of this report (six months).

The hysterical personality structure in this patient and the hysterical nature of her symptoms are quite clear. Whether the relationship and experience with the uncle were fact or phantasy is of little importance as far as the production of the actual symptoms is concerned. As in the first case, the pruritus satisfied both the repressed and forbidden sexual wishes and the resulting guilt feelings. The guilt towards the rivalrous aunt was further indicated by the need of the patient to support and care for the aunt in the latter years of her life.

One of the most interesting psychosomatic correlations was the itching and scratching that developed during the interview when the memory of the theatre scene was recalled.

After her husband's death she was stripped of her strongest defense against sexuality—the masochistic marriage itself—and again she found herself exposed to

tempting situations in that she was an attractive widow. As a result of the weakening of the defenses and the increased sexual drives (menopause) the symptom broke out. Just what precipitated the second outbreak ten years before is not clear although there is no doubt but that further interviews would settle this point. Just why the symptom disappeared after she returned home is also not clear. Whether she gained a certain amount of emotional and intellectual insight, or whether she was relieved by suggestion (despite the avoidance of suggestion as much as possible), or whether the socially acceptable gratification of certain aspects of the physical examination (cystometrogram) relieved the symptoms are difficult questions to answer. In regard to the latter possibility it might be of interest to quote from a letter which she sent to the doctors who cared for her in which she expressed her deep appreciation for their help, and in speculating as to what "cured" her asked "was it the terrible bladder test so delicately administered by lovely-faced Dr.—" (She complained bitterly of pain during and after the cystometrogram.)

SUMMARY

The case histories of two patients suffering from pruritus vulvae have been presented in which the psychogenesis of the disorder was that of an hysterical conversion symptom.

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DISCUSSION

Chairman, Dr. Franz Alexander, Chicago, Ill.

Dr. S. W. Becker (Chicago, Ill.): Dr. Rosenbaum has just discussed an important dermatological symptom, namely that of itching. Having been interested in the mechanism and especially the relief of itching for some 20 years, it might be advantageous to present the results of my research on the subject, since it is only by comparing notes obtained by physicians interested in different medical fields that we are eventually going to solve our problems.

First of all, terminology is important. Diagnosis of pruritus is made only when there is no cutaneous disorder of which itching might be a symptom. This factor eliminates fungus and yeast infections and other disorders of the mucocutaneous junction at the vulva from consideration as "pruritus vulvae."

The term "psychosomatic" has always troubled me. As I understand it, psychic processes are only part of neurological activities and, if you would escape the fate of the allergists who have for some years tried unsuccessfully to prove that certain cutaneous disorders are allergic in origin, it seems to me that use of the designation "neurosomatic" is more apt to gain universal recognition and to obtain cooperation of workers in other fields of medicine. It must be remembered that isolated cases cannot be presented as evidence and that, in research, a condition must be established in over 50% of instances before any valid claims can be made.

A proctologist, speaking in Chicago some months ago, stated that pruritus ani is organic in 90% of instances. I would reverse the figures and say that it is inorganic or, in other words, "functional" in 90% of cases. This figure would also hold for patients whom I see with pruritus vulvae.

The mechanism of production of functional diseases is, of course, unknown. However, the outstanding findings in patients with such disorders are that they are overactive and oversensitive. Overactivity results in the formation of products of exhaustion. Oversensitivity results in exaggerated emotional reactions, which increase the exhaustion. One would think that exhaustion would induce a sense of fatigue, as the result of which the patient would rest. However, patients with functional diseases do not have a normal sense of fatigue to serve as a brake on their activities. The products of exhaustion, instead of stimulating nervous pathways which would make the patient feel tired, perhaps stimulate other nervous pathways, which result in functional disorders. Psychiatric difficulties would increase the patients exhaustion, and either pull the trigger of the already loaded gun, or result in aggravation of symptoms. The author has stated that pruritus is seen in various psychiatric syndromes.

The flareup of fungus infection of the feet, reported by the author, can also be explained by a combination of increased hypersensitivity and increased sweating, both of which could result from exhaustion.

We must realize that we are dealing with intangibles and, while we are entitled to present working hypotheses or theories, we must realize that they are entitled only to consideration as such until improved physiological methods have been devised to aid us in final evaluation of the mechanism of production of functional diseases.

Dr. Stephen Rothman (Chicago, Ill.): I think Dr. Rosenbaum is to be congratulated for this very fine presentation.

If I may make a few comments, the first would concern a clinical observation which, as far as I know, has not been notated in textbooks or articles concerning pruritus vulvae of psychic origin. If pruritus is due to sexual difficulties, we often see the main or the only changes on the clitoris.

There is a thickening of the epithelium in consequence of chronic scratching and, in turn, the epithelial changes increase the susceptibility to itching stimuli. Therefore, I believe that treating psychogenic pruritus vulvae or pruritus ani locally is not as ridiculous as it would seem at first. I agree with Dr. Becker that at least 90 per cent of the cases of pruritus vulvae are of psychic origin, and still,

by treating them with x-rays and with crude coal tar ointments, they clear up. This cure is accomplished because local susceptibility to itching stimuli is decreased by local treatment.

The thickening of the epithelium on the vulva and anus not only decreases the threshold to physiologic itch stimuli, but also causes inadequate stimuli, such as cold and heat and finest touch, to elicit a paroxysm of itching. So we have to regard this problem from both the psychic and the somatic angles.

The conception that patients enjoy scratching is rather old. This view was first discussed by E. B. Bronson of New York in 1890. In 1904 L. Jacquet, a French dermatologist, used the term "onanism cutané," meaning that scratching is a substitute for sexual orgasm.

In the overwhelming number of patients seen in dermatology departments, itching and scratching do not at all seem particularly enjoyable. Patients stop treating themselves after their ringworm infection has disappeared from between the toes because they do not itch any more. After all, if a man has no toothache, he doesn't go to the dentist.

It has been my experience that all patients whose itching has been stopped by dermatologic treatment come back smiling, whereas at first they were crying. Maybe that is a very superficial observation from the psychologist's point of view. Still it remains to be proven that, contrary to his appearance, the patient regrets to be cured and wishes to relapse.

If I am allowed, I also would like to make a more general remark. The pendulum between the organ-pathologic view and the tendency to regard the "patient as a whole," including his personality, his worries and ambitions, at present is swinging strongly in the latter direction. Of course, it is very desirable that it is so. Dermatology has made tremendous progress in this direction through the work of S. W. Becker and of J. H. Stokes. But we must be on guard not to let the pendulum get completely off balance.

We see patients these days with nail polish eczema, or with itching because of Hodgkin's disease, who have been sent away by the doctor with the remark that their itching comes from their nerves and that they had better take some phenobarbital.

The most remarkable case I have observed in the field of psychosomatic fallacies was the case of a lady who had two great emotional shocks during her life; once when her father died and once, I think, when her husband died. On both occasions she broke out with an intensely itching papular eruption. The cause of the eruption, it was found later, was hypersensitivity to chrysanthemums which decorated both coffins.

Almost everybody is under a nervous strain today, and excitement, tension and grief is sold at the newsstands day and night. Skin eruptions are rather common events too. Therefore, coincidence of emotions with the outbreak of cutaneous eruptions, with improvements or exacerbations of the skin condition must be very critically evaluated before we are entitled to regard those coincidences as significant.

The Chairman: I don't want to butt in on the discussion because I am quite sure that Dr. Rosenbaum will answer some of these interesting questions, but I want to remind my friend, Dr. Rothman, that there are pleasant sensations which are connected with pain.

The human personality is a very complex thing. There is a Hungarian saying that the Hungarian entertains himself while weeping. The human personality is not homogeneous but an extremely heterogeneous thing. There are various pleasures, such as alcoholic intoxication, which contribute at the same time to self destruction.

Dr. Rothman: Still, weeping is much nicer than itching.

The Chairman: Itching may be a very painful sensation and contain an element of gratification.

Dr. Edward Weiss (Philadelphia, Pa.): May I take just a moment to add a word regarding multiple factors in the etiology of itching. The problem of psychosomatic medicine must always remain the fundamental relation between psyche and soma but instead of speaking of either/or, we have got to learn to talk in terms of the complementary relationship of many factors.

Some years ago I was consulted by a doctor's wife who had had a short period in analysis for hysterical symptoms, among which was pruritus ani. There was considerable improvement; many symptoms were abolished; but pruritus ani recurred after many years of freedom.

Her physician husband was the kind of a gentleman who was very sympathetic and understanding in regard to neurotic disorders in his practice but at home, when his wife became ill, he would dismiss the illness as neurotic and let it go at that.

On this occasion when she started to scratch herself, he very quickly said, "It's only neurotic; you ought to be able to control it."

In the course of taking the history, there was one fact to which little attention had been paid. She was very susceptible to poison ivy and had once suffered a severe attack. A dermatologist in Philadelphia at the time was experimenting with the administration of poison ivy extract by mouth. The patient had been on increasing doses of the extract for some months but her husband had forgotten about it.

I called the dermatologist up because I knew nothing about the subject and said, "What can you tell me about poison ivy immunization by mouth?"

He answered, "Well, I think it works all right but you have to look out for pruritus ani because the extract may be excreted as such and it often causes a lot of itching."

Perhaps allergist and psychoanalyst together would like to answer why each year, as she gets her immunizing dose, now by hypodermic instead of by mouth, she gets a recurrence of pruritus ani.

Dr. Maxwell Gitelson (Chicago, Ill.): I should simply like to report a clinical experience to contribute further to the confusion about the mechanisms of pruritus.

Recently I was asked to see a patient who suffered from pruritus vulvae, who had been treated very vigorously by various medical means without relief. Among other measures she had—and this is the point—a very thorough nerve block. Despite that, there was no relief from the pruritus.

I held one interview with the patient. It was a very circumspect interview. I interviewed the husband. I won't

trouble you with the history. It is sufficient to say that there were many elements in the picture to convince me of the psychogenic origin of this symptom.

Circumstances made it necessary for me to refer the case to another psychiatrist who was not so circumspect as I, in interviewing the patient. He spent two hours with her. He was very vigorous in his interview. He was very specific in making statements and interpretations which were convincing to me and convincing to others who would understand the situation but, on the surface, were not convincing to the patient.

The upshot was that she thought well of me but didn't think well of the second psychiatrist. However, she did get over her pruritus vulvae.

Dr. Milton Rosenbaum (Cincinnati, Ohio): I wish to thank the discussants. We are all aware of the tremendous stimulation that Dr. Becker has given and contributed to the understanding of so-called functional skin disorders. Certainly, there are neuro-pathways involved, these things do not take place in a vacuum.

Dr. Rothman brought out the point of treating these conditions locally. I think there is no question that one could do that, but I think you also have to remember, that there are psychological factors involved there, too. One would wonder what the psychological factor was of giving a person permission to indulge in certain gratifications that might come from a good deal of application of ointments to parts of his anatomy which are highly charged emotionally.

The question came up about psychotherapy in terms of telling patients to go away and rest and take sedatives. Certainly, that is part of psychotherapy but isn't the whole thing. All too frequently this is the only therapy utilized in dealing with patients with emotional problems and at times it has very little to do with relieving the real factors producing the emotional tension. In many cases it really amounts to "evasive therapy."

One of the things that has interested me is the question of precipitating factors in illness, whether purely functional or psychological or whether there are structural lesions, and we have a psychosomatic condition. I think that is where the breach is the widest between the dermatologist or the internist and the psychiatrist. That is because the precipitating factor on one hand may be so striking that the doctor would pick it up very easily. On the other hand, a precipitating factor may be a tiny, hidden and sort of a secret affair which might take a long time to get out. I think that was the interesting thing in the case of the first patient.

I am sure that, if she had come into the office of a psychiatrist or dermatologist or gynecologist and had given a history of seasonal occurrence of her pruritis in March, it would only be natural to think of that in terms of some allergic manifestation because of the seasonal occurrence. But, you see, after we knew a good deal about this patient, we were able to, let's say, convert the allergic or seasonal factor into a specific, psychological, precipitating factor.

Finally, Dr. Alexander has already answered the question of pleasure in pain. I think all we have to do is to cite cases of malingering. We have all seen such patients who will endure intense suffering. I am sure we can't understand those phenomena unless we understand the concept of pleasure in suffering.

NOTICE

Due to an unprecedented demand for back volumes of the journal, PSYCHOSOMATIC MEDICINE, the issues listed below are out of print. Anyone who wishes either to donate or sell these numbers will please communicate with the Editorial Office.

Volume I, No. 4, October 1939
Volume V, No. 1, January 1943
V, No. 4, October 1943
Volume VI, No. 1, January 1944
VI, No. 2, April 1944
Monographs. White, Cobb & Jones: Mucous Colitis
Kardiner: Then Traumatic Neuroses of War

REVIEWS OF PERIODICAL LITERATURE

MENNINGER, KARL: *Abuse of rest in psychiatry.* J.A.M.A., **125**:1087, 1944.

The naive notion that the Weir Mitchell rest treatment, for example, is specific for any and all cases of "nervousness," despite its persistence, is certainly not generally followed today. However, a reminder of the role of rest may not be inapposite. It is most dramatically effective in war cases where immediate intolerable experiences are precipitative rather than basic neurotic patterns. Lest the startling success of rest treatment in these cases be overvalued, it is pointed out that the abuse of rest as a treatment in psychiatric conditions represents a neglect or misunderstanding of the real condition of the neurotic patient under the guise of a treatment which is not only futile and expensive but very often definitely harmful. The fatigue for which rest is prescribed is not the cause of the neurotic illness but rather its expression. The neurotic patient must be taught how to work and how to play in order to teach him how to really rest. (F.V.L.)

HARRISON, TINSLEY R.: *Abuse of rest as a therapeutic measure for patients with cardiovascular disease.* J.A.M.A., **125**:1075, 1944.

The last three decades have seen a tendency to regard prolonged rest in bed and complete abstinence from economic activity as the *sine qua non* of the proper management of the more serious forms of heart disease. Recent experimental studies have shown, however, that extreme restriction of body movement causes increased mortality in animals with experimental myocardial injury. There is no proof that rest in bed, carried out many weeks after symptoms have disappeared, is of value in the physical management of the patient with congestive failure, angina pectoris or myocardial infarction. Psychically, there is a definite disadvantage in the enforcement of a rigid regimen after the acute phase of the illness has subsided. The following positive suggestions are made: Persons with congestive heart failure should be allowed out of bed for several hours a day as soon as severe dyspnea at rest has subsided. Following myocardial infarction, recumbency should not be prescribed for a longer period than two to three weeks after the more acute and alarming symptoms have subsided. The recumbent position should not be enforced on patients who are more comfortable sitting. Other things being equal, it would appear wise to allow elderly patients out of bed sooner than younger ones. Rest in bed for more than a day or two at a time probably has no place in the treatment of angina pectoris except in those patients who are specially liable to develop in the immediate future myocardial infarction, as indicated by increasingly frequent and prolonged attacks at rest. (F.V.L.)

EASTMAN, NICHOLSON J.: *The abuse of rest in obstetrics.* J.A.M.A., **125**:1077, 1944.

This paper deplores the industrial practice of dismissal of pregnant women. "This abuse of rest imposed on pregnant women by most industrial concerns is an unjust and unnecessary penalty for motherhood and stands in need of correction." Likewise an abuse of rest is that "axiom of maternity," the notion that two years is a *desideratum* between pregnancies. Citing studies of 5,000 cases and 33,000 cases respectively, the author shows that the longer the interval between births the more likely the mother is to suffer from some form of hypertensive anemia of pregnancy, for example. In other respects, the same statistical studies explode the axiom; for instance, the incidence of premature labor, anemia, postpartum hemorrhage and puerperal infection is no greater when the interval is twelve to twenty-four months than when it is longer, nor are mothers in this brief interval group less able to nurse their babies. (F.V.L.)

POWERS, JOHN H.: *The abuse of rest as a therapeutic measure in surgery.* J.A.M.A., **125**:1079, 1944.

This paper reports on 100 consecutive patients who were allowed to sit in a chair and to walk on the first day after major operations, compared with 100 patients who remained in bed for the traditional period of ten to fifteen days after operations of the same type and magnitude. For the sake of simplification the operative procedures were limited to hernioplasty for inguinal, femoral, umbilical, epigastric and incisional hernias; appendectomy for acute appendicitis, including cases of perforation with abscess and peritonitis; cholecystectomy with and without exploration and drainage of the common duct, and hysterectomy and other major pelvic operations performed through an abdominal incision. The patients in both groups were all over twelve years of age.

The temperature and pulse rate during the postoperative convalescence, the number of days of confinement to bed, the length of time spent in the hospital and the total duration of the convalescent period were chosen as criteria for comparison. The convalescence was considered as beginning with the first postoperative day and continuing until the patient resumed full activity at the work which was interrupted on entrance to the hospital for surgical treatment. Statistical conclusions are too detailed for proper presentation here, but showed that in this study of 100 cases no single contraindication to the early postoperative activity appeared. (F.V.L.)

DOCK, WILLIAM: *The evil sequelae of complete bed rest.* J.A.M.A., **125**:1083, 1944.

This paper, in contrast to the others on the general topic, brings out positive ill effects originating in the bed rest *per se,* such as bone atrophy, muscular wasting, vasomotor instability and the like. Emphasis is also placed on therapeutic measures necessary to minimize the hazards of complete bed rest, omission and restriction of narcotics, sedatives, encouragement of deep breathing exercises and the like. (F.V.L.)

GHORMLEY, RALPH K.: *The abuse of rest in bed in orthopedic surgery.* J.A.M.A., **125**:1085, 1944.

Fractures of the femur, lesions of the spinal column and arthritis are discussed. In femur fractures it is noted that various methods of pin fixation are being perfected to get

patients out of bed sooner. In treatment of fracture of the neck of the femur by means of a three-flanged nail most surgeons prefer to keep the patient in bed for three to five weeks after such fixation, a great reduction in bed rest. In operations for fusion of the spine, patients may get up for a short period daily three weeks after operation. In arthritis, "the day an arthritic gives up and goes to bed is the day he becomes a total cripple." (F.V.L.)

DUNBAR, FLANDERS: *Screening and remaking of men.* Survey Graphic, October, 1944.

A comparison of World Wars I and II is made in relation to changes in human material and in medical procedures necessary to keep it fit. In this connection the concepts of "screening" and "remaking" (or rehabilitating) men have become prominent. The objective of screening is to obtain an individual picture of each person, whether his place is to be in the armed forces or in the industrial army. In World War II more accurate screening is possible than in World War I because of the possibility of the superimposition of the "personality profile" picture upon the more traditional X-ray and fluoroscopic types of technique, thus making possible a final three-dimensional evaluation as if by stereoscope. Any one looking at this field as a whole must note the lags in application of the newer techniques and knowledge along the lines that "we need education in the obvious."

Remaking individuals proceeds along two main lines: better placement and increasing their effectiveness. There is still too great emphasis upon rehabilitation of the injured and too little on creative prevention, increasing the health and efficiency of those who have not yet developed to their complete capacity.

In marked contrast to World War I, of course, there is no startling percentage of syphilitic, feeble-minded and epileptic fighters sent overseas; nevertheless amid the welter of statistics calling attention to the problem, one especially stands out: 80% of military-medical problems require the attention of a physician with psychiatric (psychosomatic) experience. The major military psychiatric problem of the moment, however, is created by psychosomatic disorders such as peptic ulcers, arthritis and circulatory disturbances. Recognition of this fact has had a beneficial impact on civilian medicine.

Psychosomatic even as a term was essentially unknown in World War I. Today one leading medical school, after 14 years study in the field, has opened a department of psychosomatic medicine, and other medical schools are giving serious consideration to the possibility of such training.

The same psychosomatic and psychiatric problems which are a major concern to the armed forces are the principal cause of labor wastage, although in different proportions. Illnesses formerly low on the list, or even unrecognized, are now coming to the fore. Today the psychiatrist deals less with epilepsy and more with accident-proneness, peptic ulcer, circulatory instability and the general range of psychic breakdown under stress because of: 1) The change in the type of illness which produces the major mortality and incapacity today as compared with thirty years ago; 2) the change in screening; 3) the change in the character of warfare.

On the industrial front total U. S. accident toll for 1943 was 10,100,000. Most accidents occur as a result of an accident habit which is really an illness. Persons who have accidents are also the type who make mistakes that sink a ship, lose a battle or explode a munitions plant. Considerable work has been done on a method of identifying sufferers from the accident habit. There are so many of them that the solution must be found at present in placement rather than screening or treatment.

A leading military psychiatrist has pointed out that the tradition of rugged individualism is unsuited to the teamwork and the feeling of responsibility for others which are necessary in a good soldier. Infantile personalities conditioned to the idea that the most important thing in life is to avoid getting hurt are of little use to an army or to a cooperative and well integrated social order.

Army experience, when emotionally incapacitating, tends to cause infantile regression in those over twenty-five and to prevent those under twenty-five from growing up. If we are to be confronted with the resentments and aggressions of millions of infantile personalities who are frustrated in any attempt to return to a useful and wholesome part in civilian life, the consequences may become extremely serious. Human material of this sort would be ready-made for the demagogue, and group hostility probably would be increased both on the domestic scene and internationally. Racial and religious minorities undoubtedly would suffer. It would be far more difficult to attain rational solution of public problems. (F.V.L.)

FRIEDMAN, MEYER AND KASANIN, J. S.: *Hypertension in only one of identical twins.* Arch. Int. Med., **72**:767, 1943.

The presence of hypertension in only one of identical twins is reported. Results are given of a routine physical examination, a psychologic assay, an electrocardiographic study, and determination of the renal blood flow and of the glomerular filtration rate of each twin.

Kidney function tests revealed that the renal blood flow was similarly reduced in both the normotensive and the hypertensive twin, and that the glomerular filtration rate in each was also similar. Electrocardiograms of the hypertensive twin revealed definite evidence of myocardial damage while the tracing made for his brother was essentially normal. Other than the cardiovascular differences noted, the contrasting personalities of these identical twins composed the only striking difference observed. The healthy twin was always more robust physically and intellectually more alert than the hypertensive twin. The hypertensive twin was by far the more dynamic of the two, more aggressive, more energetic, more conscientious, and more active socially than his well brother. It is suggested that the element of rivalry, with constant repressed hostility, was the motivating factor of his success; but on the other hand may also have been responsible for his hypertension.

The evidence presented in this report suggests that renal ischemia is an incidental factor, not a causative one, in the pathogenesis of clinical hypertension. The similarity in the heredity and early environment of these identical twins stresses the divergency in personality drives as a possible cause of the hypertension found in one of them. (Authors' Abstract.)

PORTIS, SIDNEY A.: *The medical treatment of psychosomatic disturbances with special reference to the gastrointestinal tract and fatigue.* J.A.M.A., **126**:413, 1944.

Disturbances of the small intestine, segmental spasm, colicky pains, flatulence and the like have been seen in emotionally disturbed patients. Some of the vitamin imbalances, the iron deficiency anemias and disturbed protein and electrolyte balance may be due to the rapid emptying of the small intestine. This increased motility leaves too little time for complete digestion, absorption and utilization of the dietary intake. Hypothetically, many of the deficiency diseases have their origin in this mechanism. The disturbed small bowel gives to the colon partially and incompletely digested food which later alters the physiology of the colon. The colon is compelled to do what it normally should not; the results of this disturbed function may be pain, cramps, diarrhea and even constipation. The colon itself may be the receptor of these altered emotional stimuli. Colitis, often used by the physician as an escape diagnosis, is probably the result of the same mechanism.

Until reliable differentiation can be made between benign and malignant ulcer, the surgical approach is preferable to any conservative treatment, medical or psychotherapeutic. The simple, early, uncomplicated gastric ulcers that occur frequently in young persons do not necessarily fall into this category. In such cases there is a place for the psychotherapeutic approach under constant medical vigilance. . . . One cannot warn too emphatically against making the psychotherapeutic approach a panacea for all patients.

(The second half of this paper deals with hypoglaecemic fatigue, additional cases supporting the author's conclusions in Psychosom. Med., **6**:191, 1944.) (F.V.L.)

LAMBERT, CARL: *Intravenous barbiturates in the treatment of hysteria.* British Med. J., **4358**:70, 1944.

In treatment of 126 service cases of hysteria various barbiturates were given with no important difference between the barbiturates in results obtained. The pre-anaesthetic phase of light narcosis was found to be the most suitable for psychotherapy. The main advantage of barbiturates as compared to other psychotherapeutic methods was economy of time, especially in hysterical amnesia, where it was regarded as the method of choice. The mathematical evaluation or results of the whole series, statistically, showed that barbiturate narcosis produces no significantly better results than other psychotherapeutic methods. (F.V.L.)

DOWNES, JEAN: *Findings of the study of chronic disease in the eastern health district of Baltimore.* Milbank Memorial Fund Quarterly XXII: 337, 1944.

Records of two families are given, sickly and non-sickly.

The first family, observed for five years, consisted of a husband aged 31, a wife aged 38, and two children aged 12 and 3. One private physician attended the family throughout observation.

The wife was diagnosed at a psychiatric clinic before the beginning of the study as having an anxiety neurosis. She also had periodic attacks of hay fever. Her illness record for the five-year period: 2 attacks of acute bronchitis, 4 attacks of acute tonsillitis, 8 colds (2 disabling), 4 attacks of neuralgia, and 2 accidents (both of a minor nature). She had a total of 20 illnesses with 21 private physician visits. The husband reported no chronic condition when first observed, though he later complained of extreme nervousness. His illness record: 9 colds (2 disabling), 2 attacks of bronchitis (both disabling), one disabling attack of grippe, 3 accidents (2 disabling), 2 attacks of gastroenteritis and one hospital admission for operation of hemorrhoids. He had a total of 18 illnesses, 9 disabling, a total of 23 physician visits. The daughter aged 12 was diagnosed during the study as having neurotic traits and as a behavior problem. Illness record: one peritonsillar abscess, one strep sore throat, 8 colds, one accident, 5 attacks of "pain in the side." Total: 17 attacks, 8 disabling, 8 physician visits. Child of 3 had: 14 colds, 4 sore throat attacks, 2 tonsillitis, one grippe, 2 abscessed ear attacks, one conjunctivitis attack, one gastroenteritis, 3 accidents, measles, whooping cough. 30 illnesses, 13 physician visits. Sum total, family of 4, 85 illness attacks, 65 physician visits in 5 years.

Striking points: more than one member was diagnosed as neurotic, repeated family epidemics of respiratory conditions and the like, all members of the family had at least one accident during the 5 years.

Family II: husband 55, wife 44, daughter 15, sons aged 13, 11, 8, 4. Wife had chronic rheumatism. During the 5 years one cold, one physician visit. Husband: 2 colds, 13 physician visits. Daughter: one cold, one physician visit. Child of 8: one accident, one bronchitis, 2 visits. Other children: no illnesses. Sum total for family: 6 illnesses, 22 physician visits. (F.V.L.)

BOOK REVIEWS

DUNBAR, FLANDERS: Psychosomatic Diagnosis. New York, Paul B. Hoeber Inc., 1943, 741 pp. $7.50.

In this volume of some 700 pages Dunbar summarizes and formulates her results of a large scale psychosomatic research conducted during 12 years in the Presbyterian Hospital of New York. Sixteen hundred unselected cases (serial admissions) were studied from the psychological and somatic point of view. The patients belonged to seven diagnostic categories: fractures, hypertensive cardiovascular disease, coronary occlusion, anginal syndrome, rheumatic disease, cardiac arrhythmias, and diabetes.

The book can be divided into three major parts—the first on methodology, the middle part on correlation between personality and disease, and the third on theory. The methodological part is the outstanding achievement of this impressive study; it represents what might be considered a lasting and valid contribution to medical education. It explains simply and convincingly the technique and the ration-

ale of psychosomatic history taking. The case history examples and excerpts from interviews are instructive and carefully interpreted. This portion can be easily understood by the general practitioner who will gain a new point of view and cannot help being influenced by it in his whole medical orientation. In the rest of the book its pioneer qualities come to expression in its uneveness as to conceptual clarity, judgment, and presentation. Some of the chapters, for example the one devoted to the statistical and psychological analysis of fracture cases, are sound and convincing; the chapters on rheumatic conditions and diabetes on the other hand are full of debatable statements and conclusions. The chapters on cardiac conditions represent a mixture of interesting observations and constructions together with less convincing statements. The chapter on the evaluation of Rorschach results is again a bright spot of this publication so rich in details and ideas.

The author found in all seven diagnostic groups a definite correlation between personality structure and disease. The most outstanding feature of the cardiac cases is a consistent, mostly intellectual, striving towards success which is most outspoken in coronary patients, is somewhat mixed with imagination and the trend towards enjoyment in angina patients and least realized in hypertension patients. In many respects these patients contrast sharply with the accident prone fracture cases. The latter are impulsive, unsystematic, adventurous persons living for the present and not for the future as the coronary cases. The coronary patients display in a high degree what Freud called the "reality principle," or in other words a highly developed rational control over behavior, the capacity of postponing and subordinating actions to long term goals. In contrast the fracture patient is prone to immediate action, his main expression is muscular and does not take place in thought and speech. This contrast seems well substantiated, while the finer differences which the author claims for coronary, angina and hypertensive patients are not quite so convincing. These conditions are somatically closely connected and often develop from one into another. It is scarcely believable that the differences claimed for the total personality make-up should represent relevant findings.[1] The author is aware of this fact and therefore her tendency to pay attention and devote considerable space to these finer and less relevant personality differences appears somewhat confusing and misleading. Such exaggerations, however, are natural in first approaching such a virgin territory and everything which shines appears as gold to the zestful explorer. However, the group differences between the three cardiac groups and the fracture group appear to be real and significant. The author's evaluation of this significance, however, arouses some questions of fundamental nature.

The author is aware that many of the correlations between personality features and disease are not direct correlations, are not relevant and often have no etiological significance. However in the reviewers opinion she often attributes to these correlations a greater significance than they deserve. In general she took as a model her well founded findings on fracture patients. The relationship between accident proneness and certain clearly definable personality features is well founded and is one of the most valid contributions of the book. On the other hand the relationship between the personality features of coronary cases and the somatic condition seems to be much less simple. This relationship is certainly not a one way proposition as in the fractures. The author describes more precisely and in much greater detail than ever was done before the well known fact concerning the frequency among coronary patients of such professional groups as physicians, priests, lawyers, and executives who carry great responsibilities and are "brain-workers" par excellence. In a sense coronary disease appears almost as an occupational disease. It seems that a certain type of living, a type of mental exertion, creates somatic conditions which are conducive of progressive changes in the vascular system. The correlation then is not directly between personality make-up and disease but between mode of living and disease. It is true that the mode of living has a high correlation (although not an absolute one) with the type of personality. This explains a certain statistical correlation between personality and disease. This type of indirect correlation has, however, an entirely different significance than the direct so-called "causal correlation." A typical example of such an indirect correlation is the author's statement that coronary patients are frequently distinguished looking. This distinguished look is obviously correlated with the fact that they are so frequently both educated and successful people belonging to certain intellectual occupations and the distinguished look most probably has no direct correlation to the coronary disease itself. This type of correlation is of the same nature as such a finding that in Italy among industrial workers there are more blondes than among agricultural workers. This correlation would only reveal the fact that the industrial area of Italy is in the North where more blonde people live than in Southern Italy. It does not, however, reveal any mystical relationship or affinity between industrial work and blondeness.[2] A critical distinction between indirect and

[1] (*Psychosomatic Diagnosis*, p. 365): "The individual characteristics of patients in this group resemble so closely those of patients with coronary occlusion that there is little point in listing them in detail. The difference is mainly one of emphasis."

(p. 641): "Some medical authorities believe that hypertensive cardiovascular disease, anginal syndrome and coronary occlusion are physiologically so close as to be different aspects of the same disease process. If this is true, it would tend to substantiate the personality profiles for these syndromes because they show more similarities than any of the other profiles outlined." [See also p. 640.]—F.D.

[2] (*Op. cit.*, pp. 694-5): "Such a sketchy summary of the material as that given in Chapter X may be confusing because it may give a vague idea of conflict with authority, conflict over sexual role, as entering in various ways into all the groups of patients mentioned, and the reader will remember stern parents cropping up in several groups and lax parents in others. Nevertheless, the problem here in so far as it is descriptive follows very much the pattern of Martin Hewitt's formula for the detective:

"'If I were in search of a man (Martin Hewitt would say) of whom I knew nothing but that he squinted, bore

relevant correlations is by no means conceptual hair-splitting. Although in several places the author admits that correlations described by her have only a limited, "only statistical," validity, there is insufficient differentiation between relevant (causal) and secondary correlations. Overlooking the difference between these two types of correlations is the source of many questionable formulations in Dunbar's book. In spite of this, Dunbar's personality profiles contain valuable information; their meaning, however, will become clear only in the future when the psycho-physiological correlations between emotional factors and somatic symptoms is better understood. At the present state of our knowledge we understand, at least roughly, the psychosomatic mechanisms involved in hypertension, in asthma, in peptic ulcer, and—thanks to Dunbar—in fracture cases; in these conditions, therefore, such data as contained in Dunbar's personality profiles are meaningful.

In explaining the psycho-physiological mechanisms Dunbar operates all through the book with the concept of "somatic short circuit." This concept is most consistently expressed in the following sentences: "When a somatic short circuit occurs, it means simply that the cerebral cortex, which normally would have utilized a certain quantum of energy in a certain organization of external behavior, instead has to discharge this energy through the only other channels open to it, that is, through the involuntary and vegetative parts of the organism. It therefore should occasion no surprise to discover that when a person subjected to an unresolved emotional conflict, attempts to discharge energy in action or to develop defenses against it in the form of a certain pattern of behavior, and then this pattern is found to be an insufficient channel of discharge, or is denied by the circumstances of the environment, the resulting short circuit in somatic processes should also occur in a certain pattern, specific in each case to the pattern of impulse and reaction which has become insufficient or is blocked." (Page 657.) In the reviewer's opinion this concept of "short circuit" visceral expression or discharge of emotions, which is formed after the model of the hysterical conversion cannot be applied to any of the conditions which Dunbar deals with in her book. The concept of somatic short circuit is that emotional tensions if barred from adequate expression such as speech, expressive movements and coordinated actions, find discharge in somatic symptoms. But somatic manifestations are the normal physiological concomitant of these emotions and not their expression or substitutive discharge. The blood pressure becomes elevated and the pulse rate increased even when the individual gives normal free expression to his rage, attacking his enemy, threatening him and yelling at him. The only difference due to repressing these emotions consists in the fact, that by repressing them the emotional tension becomes chronic. Therefore, in vegetative neuroses the morbidity of the condition consists in the chronicity of the emotional state.[3]

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a birthmark on his right hand, and limped, and I observed a man who answered to the first peculiarity, so far the clue would be trivial, because thousands of men squint. Now, if that man presently moved and exhibited a birthmark on his right hand, the value of that squint and that mark would increase at once a hundred or a thousand fold. Apart they are little, together much. The weight of evidence is not doubled merely; it would be only doubled if half the men who squinted had right-hand birthmarks; whereas the proportion, if it could be ascertained, would be, perhaps, more like one in ten thousand. The two trivialities, pointing in the same direction, become very strong evidence. And, when the man is seen to walk with a limp, that limp (another triviality), re-enforcing the others, brings the matter to the rank of a practical certainty. The Bertillon system of identification—what is it but a summary of trivialities? Thousands of men are of the same height, thousands of the same length of foot, thousands of the same girth of head—thousands correspond in any separate measurement you may name. It is when the measurements are taken *together* that you have your man identified forever.'

"If the point is kept clearly in mind that the general pattern of the patient's difficulties and his reaction to them must be evaluated for psychosomatic diagnosis, confusion need not result from the discovery of minor variations. In this field physicians are just reaching a stage corresponding with that in general medicine when Osler and others were giving us a nomenclature together with description of various disease syndromes. Every experienced physician knows that it is the fundamental pattern that is important, not the presence or absence of this or that minor symptom." (See also pp. 655-6.)—F.D.

[3] (*Op. cit.*, p. 14): *"Inadequate expression or solution of emotion or emotional conflict is particularly likely to occur when the emotion is not a response to what appears to be real, an external situation or danger.* The physiological changes brought about by the response to an imagined attack may be identical with those brought about by a real attack except that they are potentially more dangerous somatically because less likely to be appropriately expressed in action.

"Psychological-physiological responses are more or less appropriate to situations in the outer world, and in different cases are more or less adequately carried to conclusion. In the case of fear aroused by a scene of shooting there is possibility of adequate somatic expression in a number of ways, as for example running to cover, which may be the most appropriate thing to do under the circumstances. The somatic accompaniments of the emotion, such as the change in blood distribution, the increased red blood corpuscles, adrenalin, and extra sugar, all of which are preparing the body for crisis in terms of battle or flight, are utilized in action. But for the man upset by a crash in the stock market, those somatic changes are not likely to be useful because the action for which they are preparing is not likely to take place. *If action is inappropriate to the actual situation, or inadequate to solution of the confronting problem, the emotion with its physiological accompaniments is likely to be inadequately discharged and so disturb the equilibrium of the organism concerned."*

Such patients are chronically, or at least very frequently, under the influence of anxiety or rage because their expression is inhibited. The physiological symptoms, however, are not short circuit substitutes for the normal discharge of these emotions but their normal physiological concomitants. They are not substitutes for adequate behavior like hysterical conversion symptoms. The latter are the symbolic expressions of emotions and they relieve, at least to some degree, the symbolically expressed emotions.

It is true the author recognizes that these visceral responses are not symbolic expressions like hysterical symptoms but she still considers them as substitutive (short circuit) discharges of emotions. This distinction is certainly a step in the correct direction, however it is not a sufficiently precise differentiation between conversion symptoms and this type of vegetative disturbances because the vegetative sequelae of rage and anxiety, like elevation of blood pressure or changes in heart action, neither express these emotions nor relieve them by discharge. A patient, who chronically is under the influence of rage or fear necessarily will have chronic vegetative innervations which, however, in themselves are quite normal; their morbidity consists only in their chronicity. Therefore such vegetative disturbances cannot be considered as the dynamic equivalents of normal expression. They do not substitute for the normal expression of emotions *because they are always* present whether the emotion is freely expressed or is inhibited. In accidents provoked by unconscious tendencies, however, the concept of substitute emotional expression is fully justified. Here the morbid behavior (slips causing accidents for example) is often the direct expression of certain emotional states.

If the psychosomatic approach is to make a real impression upon the development of medical thought it is imperative to introduce a conceptual clarity into these fundamental issues of psycho-physiology. The interpretation of emotionally conditioned somatic disturbances as a somatic short circuit or, in other words, as a dynamic substitute for goal directed adequate behavior which is inhibited on account of neurotic conflicts should not be applied indiscriminately. The elevation of blood pressure, the changes in the heart beat, the secretion of insulin, the mobilization of sugar, are not based on expressive innervations but on adaptive innervations. The pancreas does not express or discharge emotions, neither are changes in adrenalin production short circuit discharges of any emotional tension. Adrenalin production, however, is normally subject to emotional control. Chronic emotional tensions due to neurotic conflicts are of necessity connected with chronic vegetative changes. This type of somatic sequelae of neurotic states follows entirely different dynamic principles than the hysterical conversions in which the symptom takes the place of a repressed emotion.[4]

This book contains such a host of valuable observations and information that it cannot fail to have an influence on current medical thought. Therefore, it is so important that its conceptual framework should be sharpened and brought into conformity with sound principles of physiology.

Another important reservation pertains to correlating somatic disturbances with distinct personality types. The thorough investigations in the past of some psychosomatic correlations has shown that the disturbance of vegetative functions can be directly correlated with certain rather specific emotional states but not with the total personality configuration. Thus chronically sustained hostile impulses can be correlated with chronic elevation of blood pressure; strong dependent, help-seeking trends with increased stomach secretion. However, there are peptic ulcer patients who do not show this personality structure at all, patients who do not repress their help-demanding attitudes but are constantly frustrated in their gratification by external circumstances. We have learned that it is of secondary importance whether or not the dependent tendency which chronically mobilizes the stomach secretion is thwarted by internal factors such as pride, or by external factors like a cold, rejecting wife. Similarly the nuclear conflict in asthma cases is well circumscribed and distinct (fear of separation). However, it may occur in a great variety of contrasting personality types. All this does not mean that Dunbar's personality portraits are of no value. They must be considered as crude observational material, the meaning of which will only become clear if the neuro- and psycho-physiological mechanisms involved in coronary cases, angina, rheumatic disease, cardiac arrhythmias, and diabetes will be established. There is no mysterious vague correlation between personality and disease but a distinct correlation between certain emotional constellations and certain vegetative innervations. Whatever

To continue (*op. cit.*, p. 16): "Alexander has written as follows:

" 'Normally the individual who laughs or weeps is able to some degree, at least, to define the psychological reason that impelled him to laugh or to weep. This is not the case with patients who are suffering from a stomach neurosis. Such a patient is not able to describe those emotions which are responsible for his stomach symptoms; he is not even aware of the psychic origin of his symptoms; he will deny it and try to find some somatic basis for his ailment; and in so doing is, in most cases, supported by his physician. The psychogenic disturbance is an unusual or, one should say, an incomplete expression of a psychic tension. It does not give full relief to the causative emotional tension in the same way as laughing or weeping does. The symptom not being able to relieve the psychic tension in the same way as normal psychomotor reflexes do, a permanent tension is sustained which is the cause of the chronic dysfunction.' "—F.D.

[4] The fact is stressed that such responses cannot be understood in terms of the concept of conversion hysteria, as follows (*op. cit.*, p. 646): ". . . . the symbolism which Freud discovered in conversion hysteria cannot explain the choice of the channel for the repressed conflict, because these internal organs are usually unknown to the child and perhaps are unknown even to the unconscious. Not being parts of the body through which we ordinarily express conscious emotion, they cannot well be vehicles of symbolic action. What they can express is rather the physiological consequence of emotional tension."—F.D.

correlation is found between personality type and somatic disease is only of statistical nature. This is particularly true for emotionally conditioned disturbances. Under the given cultural conditions certain emotional constellations are more frequent in certain personality types than in others. Of course much depends upon how one defines personality types—whether one calls personality the total dynamic structure or the presence, absence, or frequency of certain emotional attitudes. The author recognizes that many of the correlations she described are only of statistical nature; however this is overshadowed by statements which give an opposite impression.[5]

Finally a critical review cannot omit questioning the expression and concept of "emotional thermodynamics." The second law of thermodynamics expresses a strictly quantitative relationship concerning the transformation of heat into mechanical energy and vice versa. It expresses the theoretical limits of this transformation in the ideal thermodynamic machine as conceived by Carnot and Clausius. This ideal thermodynamic machine is conceived—naturally only in thought—to operate without any friction and thus allows the calculation of the theoretically optimal mechanical exploitation of heat. To apply the second law of thermodynamics to phenomena which cannot be subjected to quantitative measurement is meaningless.[6] In 1913 M. Polanyi and J. Baron in their classical treatise ("Über die Anwendung des zweiten Hauptsatzes der Thermodynamik auf Vorgänge im tierischen Organismus," Biochemische Zeitschrift, Juli, 1913), proved the applicability of the second law of thermodynamics to the living organism. Its application to psycho-physiological correlations, however, has no realistic meaning whatsoever. Moreover, it was not Charcot who deduced the laws of thermodynamics as is stated on page 653, but the French physicist, Carnot.

In spite of its shortcomings, with this book Dunbar has made another important contribution to the development of psychosomatic medicine. As was stated before the shortcomings of this book are partially inherent in the pioneer stage of our field. Its merits, too, are of pioneer nature; it is a veritable treasure chest of careful, novel, and daring observations. Its uneveness comes from an equal distribution of its merits and shortcomings. In the long run, however, this book's merits will outlive its conceptual weaknesses. The rich observational material and statistical data it contains can always be re-interpreted in the future in a more precise and sound conceptual framework. For every worker in this field as well as for the practitioner this book will be for many years to come a valuable source of information and inspiration.

FRANZ ALEXANDER

[5] See footnotes [1] and [2].—F.D.

[6] (*Op. cit.*, pp. 650-51): "The basic law of Freud's work, which now is a basic law of general psychiatry as well, ... has implications which have not until recently been fully apprehended, although Freud himself called attention to them. It is often assumed that his dynamic conception of emotion referred only to the transformations of vital energy into various patterns of emotional or mental behavior. Yet many of his cases and observations reveal the transformation of vital energy into physical symptoms, and vice versa. These symptoms were, moreover, not always hysterical or difficult to connect with bodily changes, but were often what the general physician would call 'genuine' somatic illness."—F.D.

Diseases of the Digestive System. Edited by Sidney A. Portis. Second edition. Philadelphia, Lea & Febiger, 1944. 934 pp. $10.00.

"Diseases of the Digestive System" is a comprehensive review of the field of gastroenterology contributed by fifty authors, recognized authorities in their subjects. It will be found useful both for general reading and for reference. The fact that the gastrointestinal tract is perhaps the system most frequently affected by emotional stimuli, is particularly accessible to both physiological and psychological investigation, and therefore serves as a key to understanding of the combined problems, makes such a book welcome to the student of psychosomatic medicine. Though written primarily for the internist and surgeon, and consequently abounding in practical details from the discussion of the rotation of the foetal peritoneum to the treatment of intestinal parasites, there are few chapters which the reader looking for general information will skip entirely. The crystallized experience of so many authors, considered from multiple angles, leads to the emergence, as one goes through the book, of a concept of intestinal integration and relation with the body as a whole which unifies the piecemeal and other contradictory knowledge which the average physician has acquired, or has been unable to relate properly because the facts come from such varied sources. Here they are all brought together and a good index makes cross reference easy.

The book, which is divided into six parts, starts with an historical introduction followed by a brilliant short chapter by Chester M. Jones on "The Interpretation of Gastrointestinal Tract Pain." A chapter covering detailed anatomy and physiology appearing in the first edition has been broken up and distributed as introductory material to the various subdivisions of the tract. Part II deals with "Diseases of the Esophagus, Stomach, and Duodenum"; Part III, "The Liver, Gall Bladder, and Pancreas"; Part IV, "The Small and Large Intestine"; Part V, "Dietary Concepts"; and Part VI, "Gastrointestinal Manifestations of Extra-abdominal and Systemic Diseases." The three chapters in this last section dealing with psychic, neurological, and endocrinological considerations were placed in the first portion of the first edition, a more strategic position for psychosomatic emphasis than the present arrangement which it replaces.

The statement attributed to a noted physiologist that Freud would have arrived at as comprehensive a theory of the neuroses if he had used gastrointestinal function rather than sexuality as his frame of reference, emphasizes an important point. Psychoanalysis has demonstrated the role of the gastrointestinal tract in personality development and its importance in determining many basic psychological mechanisms. A knowledge of these is essential, therefore, not only for understanding the psychopathology of the alimentary tract, but also for disturbances in other systems

such as respiratory or genitourinary to which, unconsciously, the same attitudes as acquired toward the digestive system may be applied by the patients.

This has been carried to its logical conclusion by Franz Alexander who uses reactions to intake, retention, and expulsion as an important measuring stick for psychological phenomena in general. It is of interest, therefore, for the reader to have Alexander's views presented in the chapter on "Psychosomatic Disturbances of the Gastrointestinal Tract" which appears in the sixth section of this book. Alexander first discusses the psychology of the nutritional process and the role which repression of conflict plays in shunting impulses through vegetative channels. This is followed by consideration of various disease syndromes in relation to types of disturbance found at various levels in the tract and the typical conflict situations associated with these areas. This arrangement proves a useful device in view of the necessary compactness of the presentation. The concepts presented are essential for a working knowledge with clinical problems, whether as seen by the psychiatrist or by the gastroenterologist; and, it is hoped, will be generally read and grasped.

Coverage of the vegetative and central nervous systems and of hormonal interrelation have been excellently presented in this same section in chapters on "Neurogenic Disturbances" and "Endocrinologic Manifestations" by Roy R. Grinker and Augustus A. Werner respectively. Dr. Werner's discussion of the ways in which emotions become manifest with special reference to the vegetative nervous system is one of the best summaries of this subject to appear in recent literature.

In addition to consideration of local hormones, such as enterogastrone, secretin, and enterocrinin, affecting the gastrointestinal tract, Werner indicates the important pituitary-gonadal influences. He refers to the interesting work of Daniel E. Ziskin on "pregnancy gingivitis" and his findings that in conditions resembling this, estrogenic and pyridine extracts of the anterior pituitary gland or gonadotropic hormones from castrate urine are of value in local treatment. The fact that peptic ulcer is almost unknown during pregnancy has been noted by various authors. Werner cites the studies of Sandweiss and his co-workers to the effect that estrogenic hormone does not prevent development or stimulate healing of jejunal ulcer in dogs, but appears to accelerate perforation and that anterior pituitary-like hormones prevent the development or accelerate the healing of these ulcers. These facts, coupled with clinical and experimental data on neurogenic peptic ulcers caused by lesions in the hypothalamus and adjacent areas continue to hold open the question of the degree to which peptic ulcer is essentially a local problem of disturbed circulation and erosion, and to what degree central influences enter in.

Grinker in discussion of the interplay between the orthosympathetic and parasympathetic systems stresses the fact that the general statement as to their antagonism of action does not indicate the true complexity of the physiologic picture, which varies under varying conditions of tonus and may even be synergic in effect.

In reference to gastrointestinal pain, Grinker raises the important question of whether such manifestations following abdominal operations and considered due to adhesions are not in reality secondary effects of scarring through constant stimulation of implicated nerve fibers, causing painful spasms of smooth muscle or direct stimulation of afferent nerve endings. This is of particular interest to the physician who has seen surgical interference in neurotic patients, often promoted by incorrect diagnosis or the misconception that such procedure would have a beneficial suggestive effect, lead to more and bigger operations because of symptoms attributed to adhesions. Grinker in his chapter carries considerations of the correlation mechanisms of the nervous system through the higher autonomic and cortical centers.

The psychosomatic point of view might be defined as the proportionate consideration of physical and psychic factors in medicine. Dr. Portis, as editor, is to be congratulated on his effort to correct the prevailing practice in medical text books of including detailed physiological data which presumes to be an exhaustive discussion of a psychosomatic condition without mentioning the emotional factors which may be of central importance in the understanding or management of the disease. He states in the preface to the second edition that each contributor was asked, so far as possible, to discuss the emotional aspects in connection with his special subject.

To what degree this was successful one finds evidenced in a number of key chapters. Thus Dr. Walter Palmer in "Peptic Ulcer," after an introductory review of the neurogenic basis for some ulcers, alludes to Alexander's observations on the peptic ulcer personality, and cites the important findings by Wolff and Wolf, and Mittelmann and Wolff regarding gastric changes in emotion in the formation of ulcer. Dr. John L. Kantor in "Functional Disturbances of the Colon" gives suggestions for psychic exploration and treatment including a note on the use of psychoanalysis. Sir Arthur Hurst describes a typical situation found in the mucous colitis which pertains equally to ulcerative colitis. "A young woman with mucous colic is often the sole interest in life of her widowed mother, who requires treatment as much as her daughter if the latter is to be saved from chronic invalidism. Alternatively, a mother may make her own mucous colitis an excuse for tying her daughter to her side and preventing her from living her own life." The best proportioned psychosomatic handling is in Dr. Moses Paulson's chapter on "Nonspecific or Indeterminate Ulcerative Colitis." Here preventive measures in relation to childhood in one portion are supplemented in two other places with discussions of psychogenic influences in etiology and psychogenic considerations in treatment drawn largely from the work of C. D. Murray at the Presbyterian Hospital, New York, and Dr. A. F. Sullivan at the New Haven Hospital, Connecticut. No mention is made of later contributions from the Presbyterian Hospital which have been written with special reference to the general practitioner and non-psychiatric specialist, and which the reviewer with understandable prejudice feels should be an available reference in such a book.

Dr. Sidney A. Portis in the second edition has added a short chapter on "The General Treatment of Psychosomatic Disturbances of the Gastrointestinal Tract." This deals with a basic dietary and drug management based on studies of

fatigue states in many of which Dr. Portis considers a hypoglycemic state important. Regular doses of phenobarbital to eliminate cortical influence and atrophine for the purpose of paralyzing vagus action are employed with a diet aimed at prolonging sugar metabolism. Although more work is necessary to establish his hypothesis of the frequency of hyperinsulinism in neurotic fatigue, such a drug regimen often makes the patient more accessible to psychotherapy. Also any attempt that affords hope of breaking up the sustained autonomic reflex existing in many chronic intestinal neuroses deserves exploration. A somewhat similar attempt has been made by Heath and Powdermaker in the use of egotomine tartrate in traumatic neuroses.

The shortcomings of the handling of the psychic factor in the book are merely a reflection of the difficulties in diffusion of knowledge from one branch of medicine to another and the very thing that, as mentioned, the editor is striving to overcome. One is, as Portis hoped, "impressed by the sincere attempt to lay some solid foundation for further exploration." What is urgently needed in the reviewer's opinion is not only reference to emotional factors but an elementary grasp of the psychodynamic mechanisms involved in the treatment of the individual conditions. Thus Alexander's chapter would not only "meet this need from the standpoint of the psychiatrist," but also furnishes basic understanding for the gastroenterologist and general practitioner as well. It is often necessary to take definitely into account the knowledge that dependency, sexual conflict, and repressed hostilities are unconscious determinants where mere attention to superficial factors would fail. The non-psychiatrist or non-analyst may not be equipped to deal with these, but he should know of their existence in the background.

It is through confidence often made possible by local contacts that much of this diffusion of well established principles of dynamic psychopathology has taken place. One would hope that before too long the sound principles established by the medical psychologist can become common scientific property and that it will be considered a lapse of scientific thoroughness to omit such references, as it has been up to the present time in many medical circles a lapse to include them. Undoubtedly the psychiatrist, and particularly the psychoanalyst, has been partly at fault in not presenting his findings in a more understandable form. Revisions in this direction are in progress and are being accelerated by the increasing opportunity for exchange with the more physical disciplines of medicine. It is through inclusion of basic findings of the medical psychologist in general medical text books and in journals that a common scientific approach to psychosomatic medicine can evolve. "Diseases of the Digestive System" is definitely a step in the right direction.

GEORGE E. DANIELS

YERKES, ROBERT M.: *Chimpanzees, A Laboratory Colony.* New Haven, Yale University Press, 1943, 321 pp. $4.50.

In this profoundly interesting and masterfully presented book, Yerkes sums up his lifelong experience with and knowledge of the chimpanzee. In an epilogue he describes the pioneering effort which finally succeeded in establishing the Yale Laboratory Colony for the study of controlled behavior of the chimpanzee. Since the chimpanzee not only stands close to homo sapiens in many morphological and physiological characteristics, but also behaves in a way which counts as especially human, Yerkes' conviction was that psychobiological research on chimpanzees would be a logical and practicable short-cut to human biology. In this book, he shows with carefully evaluated material, how far the work of the Laboratory Colony has already proved that his assumption was a workable hypothesis and has produced results in all of those fields of psychobiology in which controlled observations were carried out.

Out of the wealth of material Yerkes has selected the best to create a composite portrait of chimpanzee personality in terms of behavior. The chimpanzee, a gregarious, nomadic, nest building animal, when brought under observation shows a great number of individual characteristics. Long observation of the same individuals made it possible to study the unfolding of emotional patterns, their modification and replacement, and individual and species characteristics. It is impossible even to summarize here the great variety of emotional manifestations and the individual variations described so vividly by Yerkes.

A short summary of the developmental psychology of the chimpanzee might be the best way to demonstrate to the reader of this journal the great amount of comparative psychological data offered and the scores of interesting problems opened for further study.

The new-born chimpanzee is completely dependent on the mother. Its infancy lasts for a period of two years. The mother feeds, cleans, protects and ordinarily gives the infant all the attention necessary for its welfare. The mother exercises the infant, teaches it how to climb, and the chimpanzee usually achieves locomotor independence at the age of four to six months. During the infant's second half-year the mother's attitude changes gradually; she becomes a governess and teaches the infant to become a member of its society. The chimpanzee child is playful, energetic, appreciative of affection, but there are also sulky, timid, undependable individuals among them. The period of childhood lasts from the second usually to the eighth year —when adolescence begins. Adolescence begins with puberty —the appearance of menstruation in the female and of sperm production in the male. However, the chimpanzee, like man, does not become sexually mature at puberty; the years of adolescent development take from the eighth to about the twelfth year in the chimpanzee. It is extremely interesting and worth emphasizing that, as far as Yerkes' observation goes, the adolescence of the female chimpanzee is accompanied with greater emotional changes than that of the male.

While current knowledge of behavior traits and capacities of the chimpanzee during infancy and childhood does not clearly establish psychological masculinity and femininity, with the beginning of adolescence differences appear, and when complete structural growth is achieved—that is, maturation reached—the female appears less aggressive and less determined, less inventive and resourceful than the male.

During adulthood the individual becomes less companionable and more inclined to solitariness. This is again more a characteristic of males than of females. In sexual play and pre-mating activity the male tends to be commanding to the female; in general, "his postures and actions are roughly and menacingly demonstrative, strongly self-assertive, and expressive of physical strength, while hers are relatively gentle, self-effacing, ingratiating and self-protective."

The female sexual cycle is usually four to six weeks long; there are—as among human females—individuals with long and with short cycles. There are six externally distinguishable changes in the cycle: (1) bleeding, (2) post-menstrual unswollen period, (3) period of swelling, (4) maximal genital swelling, (5) detumescence, and (6) premenstrual phase with slight degree of swelling occasionally. Ovulation occurs at the height of swelling. The female ape exhibits desire to mate only during the maximal genital swelling, and at that time she may be very active in establishing physical contact and may desire mating very often. There are, however, important individual variations. Yerkes describes females who present to the male to lure him or to gain his favor—and he also observed among the 24 females of the colony two who consistently refused to mate although in both cases the sexual cycles, externally considered, seemed to be normal.

The sexual cycle is interrupted by the reproductive cycle; the gestation period in chimpanzees is about eight lunar months. Although for two or three month after conception genital swelling may occur in lessening degree, menstrual bleeding does not occur during gestation. Birth usually occurs expeditiously in one to a few hours. There is a great difference in the mother's post-natal behavior, depending on whether she is an experienced mother or has just delivered her first infant. The inexperienced mother may act as if afraid of her firstborn—she may refuse to touch it or to allow it to cling to her—she handles the infant with strange curiosity and hostility or she neglects it completely. The experienced mother gives her attention completely to the infant; she places it on her abdomen or breast, lets it cling to her, and handles it gently, while she is moving around. While this may be the manifestation of a hormonally prepared and controlled mother-instinct, the behavior of the mother toward her growing infant may reveal a more complex pattern of motherliness.

Centrally important for the psychobiologist are those experiments which were designed to elucidate the elusive problem of the psychobiological differences between the sexes. These investigations were based on the assumption that a drive for dominance functions as an urge to achieve superior social status. The experiment was devised to reveal whether there is a relation between dominance-drive and sex. "As subjects, two mates of known age, social traits and sexual status were placed together in a large open-air cage. At regular intervals of a half-minute, food was offered, a piece at a time, through a wooden chute until ten pieces had been presented. The animals had equal opportunity to try to get the food as it rolled within reach, but it was virtually impossible that each should get a part of the very small piece of banana which was presented." How do the mates respond? *"Usually one mate acts as if it were entitled by right or privilege to take the food, while the other calmly or with protest accepts its subordinate role."* The situation however changes in relation to the female sexual cycle. While during the menstrual, pre- and post-menstrual and detumescent stages the naturally more dominant member of the pair obtains the food, during the phases of sexual receptivity the female claims the food and the male temporarily defers to her and permits her to act as if dominant over him. This experiment and its many variations shows that the male acts under the influence of sexual expectation; that for the sake of later sexual gratification, or as gratitude for it, he defers his privilege of dominance to the female. Thus during the sexual receptivity of the female, not the pattern of dominance but the pattern of privilege prevails. The male chimpanzee acts there under the same motivation which originated many customs in human society. The primitive forms of such customs are noticeable in the behavior of the chimpanzees. The patterns of privilege are not as prompt and decisive as the pattern of dominance. While the experimenter observes the hesitancy of the male in giving up his dominant status, he also observes manifestations of conflicts, of inhibition, even signs of the function of conscience since the male acts as if conscience-stricken if he did not yield to what social expectancy demanded of him. The importance of such observations and further experiments based on them can hardly be overestimated by the psychoanalyst.

However this is not all that the food experiment revealed. The interpretation of animal behavior permitted the conclusion that there is a definite difference in the behavior of the male and female chimpanzee; furthermore, that there are individual differences among the males as well as among the females; these differences of personality are so basic that one has to assume that they are gene-carried; on the basis of these individual differences, there exists a sort of selective-sexual attraction which motivates the same individual to respond differently to different mates. There are domineering males and self-assertive females; females who trade easily and self-assuredly on their sex appeals, and others more passive; there are males who with gentle, superior, fatherly-like attitude handle the "capricious" female. However the same female who seems to be certain to be able to succeed in shaping the male's behavior with one mate appears timid and even self-effacing toward another male. Is this latter behavior motivated by mistrust or by a sexual feeling strong enough to subdue the female to the will of the male?

Yerkes in this part of the book which is modestly called "General Description" has shown the development of the chimpanzee from infantile, clinging dependence to social maturity. This goes through a growth process of childhood when action is motivated by need for social attachment with its insatiable craving for companionship; in adolescence and maturity the need for dominance, a persistent drive for a higher place in social hierarchy, seems to motivate behavior. However this need for dominance might be strongly influenced by sexual needs and attitudes; thus the conflict between dominance drive and the sexual need brings about modification of behavior in which we may recognize the

origins of customs, privileges and even the beginning of social regulation by intrapsychic processes, like conscience.

The second part of the book, "Mentality," summarizes the results of hundreds of separate studies on a great variety of problems in psychology, from which we mention only topics such as: auditory and visual sensory and perceptual processes; behavioral adaptations as in discrimination learning and other modes of habit formation; factors both internal and environmental which affect behavioral adaptation; memory and imagination; symbolism, ideation, insight or their counterparts; linguistic expression and capacity; suggestibility; emotional traits and their modes of expression; etc.

In the third part of the book "Care and Handling," Yerkes sums up his experiences and gives recommendations for a planned chimpanzee economy. He advises how to house, feed, protect, train and adapt the animals for any particular kind of use. The studies on breeding and rearing, observations on motherliness or lack of motherliness, experiences gained in an experimental nursery for new-born chimpanzees; the adaptation of the humanly trained infant to its natural social environment offer exciting problems to psychobiologists, educators, etc. For example, which psychologist would not be impressed by the description of such counterparts of emotional manifestations as they appear together: timidity and wildness in one, boldness and adaptability in the other individual. Although these basic emotional characteristics appear gene-carried, their alteration by breeding and/or by environmental influences is an important subject of the colony's investigation; correlating such observations with problems of human social behavior gives only one example of the many possibilities of how to use experimental psychobiology as means of human engineering.

Yerkes says farewell to the experimental colony as its director with this book in which with the mastery of supreme knowledge of his material and with humble love of his subject he succeeded in demonstrating that in the study of the adaptability and development of the chimpanzee one learns a great deal about the modifiability and consequent improvability of human nature.

THERESE BENEDEK

HOFFMAN, JACOB: *Female Endocrinology*. Philadelphia, W. B. Saunders Co., 1944, 788 pp. $10.00.

There are few fields in clinical medicine that have been abused as much as clinical endocrinology. This has been true from both diagnostic and therapeutic aspects. Thus, for example, many reports can be found in the literature concerning cures of "endocrine" obesity, Frohlich syndrome in children, baldness, leanness, fatiguability and so forth in consequence of the ingestion of crude anterior pituitary and other glandular extracts. To too many practitioners the endocrine glands still represent a source of extracts which can be administered to patients when all else fails.

In his able review of the vast literature on glandular physiology and in his clear presentation of the various glandular disturbances, Hoffman does much to bring reality to clinical endocrinology. He carefully avoids the pitfalls associated with the application directly to man of data obtained with the experimental animal and tries to stress such facts as are indisputable.

It is apparent from the outset that the author appreciates the role of the endocrine glands as a part of a complex mechanism which together with the nervous system is responsible for homeostasis. Consequently he emphasizes the role of non-endocrine factors in both etiology and therapy. Since the majority of abnormalities seen in general practice are "functional" in origin, the psychobiologic constitution of the individual is given due consideration.

This book is remarkably concise considering the extensive literature which is reviewed critically. Although the title suggests that the material is concerned primarily with the clinical aspects of gonadal and reproductive endocrinology, actually nearly every phase of endocrinology is discussed. Laboratory tests and diagnostic aids of various types are given in detail and their limitations noted. Abundant illustrations, an extensive bibliography and a comprehensive index makes this an excellent textbook.

I. ARTHUR MIRSKY

Child Behavior and Development. Edited by Barker, Roger G., Kounin, Jacob S. and Wright, Herbert F. New York, McGraw-Hill Book Co., 1943, 652 pp. $3.50

This book consists of representative studies ranging from "Reflex Activities in the Human Fetus" by D. Hooker; "Conditioned Responses in Human Infants" by M. A. Wenger; "The Development of Children's Concepts of Casual Relations" by J. M. Deutsche, to anthropological studies such as "The Hopi Child" by W. Dennis. The purpose of the book is to familiarize students with the methods and tools of a science. The selection of the studies was based on the judgment of 110 members of the Society for Research in Child Development. It was the hope of the editors that the book might find use as central rather than collateral reading in courses on child psychology or educational psychology. It was planned as an experiment in making first hand reports of scientific research intellectually and physically accessible to laymen.

There are thirty-five different chapters, each in itself a specific treatise on a special subject. Although some of the chapters are clinically oriented, at least fourteen of them are more concerned with the type of subject with which the academic psychologist deals, such as intelligence and the peripheral aspects of personality. Nevertheless, it appears that the editors themselves are aware of clinical implications. If there were a chapter early in the book which related in simple, straight-forward language the growth of a child, in both physiologic and psychologic or psychobiologic terms, it would help to orient students. It is probably taken for granted that the audience will have had considerable experience with scientific subjects and will be able to synthesize the various fields covered. It is important that the student who is embarking in the field of child behavior learn what the crucial and fundamental problems are. One is left with the belief that the best methods of understanding a child are through observations in a so-called objective manner in which reactions are quantifiable. The conception of knowing the individual child as a person, as he is primarily regarded by the psychiatrist or depth psychologist, is lacking

One raises the question, "What is the purpose of methodology and what does it serve?"

The feeling tone of the book can be gathered from the index. There are very few psychiatrists or neurologists mentioned; for example, A. Meyer, C. M. Campbell, F. Allen and L. Kanner are omitted. There is very little consideration of the vegetative or vital functions of the child; the instincts receive a minimum of treatment. There is a great deal of concern with the peripheral manifestations of the personality; for instance, there is much ado about the "ego," but the "id" does not appear.

There is much of value in the individual chapters by themselves, many of which are excellent papers upon specific subjects: for example, "Reflex Activities in the Human Fetus" by D. Hooker. This chapter is more suitable for medical students or specialists in physiology. There is little that pertains to dynamic psychology, although there are a few chapters that deal with this aspect; for example, "Experiments in Sibling Rivalry" by D. M. Levy; another chapter on "Clinical Studies and Childhood Play" by E. H. Erickson, and finally "Personality Patterns in School Children" by R. N. Sanford. It was the impression of the reviewer that this book, which is more in the nature of a compilation, might tend to confuse the student in that it presents so many various aspects of the subject without presenting a fundamental approach or a framework of reference toward the problem of child behavior and development.

J. J. MICHAELS

BRECKENRIDGE, MARIAN E.: *Child Development. Physical and Psychological Growth Through the School Years.* Philadelphia, W. B. Saunders Co., 1943, 592 pp. $3.25.

This recent publication was written to describe the many influences which permeate the development of the child. It is designed to assist us in understanding the significant forces and influences which give rise to the assets and liabilities, physical, social and emotional, in any child. The book is excellently written and the material is well presented. The various chapters are subdivided into different headings which concentrate and crystallize the material in appropriate divisions; this facilitates the reading and enhances its textbook value. The subject matter is concerned with the general principles of development, the interrelation of growth, the influences of heredity, endocrines, illnesses, emotions and nutrition, the influences of the home, school, church, camps and other community factors, social and personality development—all in relationship to child growth. Other topics adequately discussed by the authors include physical growth, growth of sense perceptions and judgments, development of memory, and growth of language, thinking and reasoning.

The book is primarily planned for students in psychology, in nursing, teachers in training, in home economics and social work. It would aptly serve as a good textbook in those fields and even aid medical students in obtaining a clearer perspective of the many factors which mold the character and behavior of children. At the end of each chapter there is a list of questions for class study and a number of articles and books recommended for selected readings. The authors have utilized and compiled an excellent bibliography of 806 different publications in writing their book. This treatise, however, does not contribute to the psychosomatic field of medicine; it was obviously not written with that purpose in mind. It is, nevertheless, an excellent contribution to the study of child development.

S. ALBERT MOLLE

BOOK NOTES

SELLING, LOWELL S.: *Synopsis of Neuropsychiatry.* St. Louis, C. V. Mosby Co., 1944, 500 pp. $5.00.

The purpose of this informative book is to enable the student to get a background of neuropsychiatry without the burden of too many details, and to serve as a guide to diagnosis and treatment. Enough of anatomy and physiology has been included to make the organic syndromes comprehensible. The sections of the synopsis which deal with psychopathology and analysis could be improved by a few pertinent quotations from acknowledged authorities, and a carefully edited bibliography.

MARTIN GROTJAHN

STRACHEY, ALIX: *A New German-English Psycho-Analytical Vocabulary.* Research Supplements to the International Journal of Psycho-Analysis No. 1. Baltimore, Williams & Wilkins Co., 1943, 96 pp. $2.50.

Alix Strachey possesses the three qualities which characterize the good psychoanalytic translator: a deep understanding of psychoanalysis, a fine feeling for the German language, and an expert knowledge of English. This little book is another proof of his gift as an interpreter and translator.

MARTIN GROTJAHN

BOOKS RECEIVED

BRILL, ABRAHAM A.: *Freud's Contribution to Psychiatry.* New York, Norton, 1944, 244 pp. $2.75.

CRUTCHER, HESTER BRANDENBURG: *Foster Home Care for Mental Patients.* New York, Commonwealth Fund, 1944, 205 pp. $2.00.

EVANS, BERGEN, in consultation with MOHR, GEORGE J.: *The Psychiatry of Robert Burton.* New York, Columbia Press, 1944, 129 pp. $2.00.

GRINKER, COLONEL ROY R., AND SPIEGEL, CAPTAIN JOHN P.: *War Neuroses in North Africa.* New York, Josiah Macy Foundation, 1943, 300 pp.

HENDRY, CHARLES E., LIPPITT, RONALD, AND ZANDER, ALVIN: *Reality Practice as Educational Method.* Psychodrama Monographs No. 9. New York, Beacon House, 1944, 36 pp. $1.50.

The Minister of Health (for England and Wales) and the Secretary of State: *A national Health Service.* American Edition. New York, Macmillan Co., 1944, 85 pp. $.75.

MUSTARD, HARRY S.: *An Introduction to Public Health.* New York, Macmillan Co., 1944, 283 pp. $3.25.

RICHARDSON, LAVANGE HUNT: *The Personality of Stutterers.* Psychological Monographs, Vol. 56. Evanston, Ill., Northwestern University, 1944, 46 pp.

ROSENBERG, B. D.: *Special Delivery; the Expectant Mother's Handbook*. Chicago, Ziff-Davis Co., 1944, 96 pp. $2.00.

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SHOOBS, N. E.: *Psychodrama in the Schools*. Psychodrama Monograph No. 10. New York, Beacon House, 1944, 19 pp. $1.50.

TOEMAN, ZERKA: *Role Analysis and Audience Structure*. New York, Beacon House, 1944, 19 pp. $1.25.

WALLER, WILLARD: *Veteran Comes Back*. New York, The Dryden Press, 1944, 316 pp. $2.75.

YOST, EDNA, AND GILBRETH, LILLIAN M.: *Normal Lives for the Disabled*. New York, Macmillan Co., 1944, 289 pp. $2.50.

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***Reiter, P. J., Experience with Benzedrine, Ugeskr. f. laeger, 99:459-460, 1937.**

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OBJECTIVE PERSONALITY STUDIES IN MIGRAINE BY MEANS OF THE RORSCHACH METHOD

W. DONALD ROSS, M.D.,* AND FRANCIS L. McNAUGHTON, M.D.†

Increasing evidence is being accumulated on the association between particular personality types or conflicts and specific physiological disorders such as migraine, essential hypertension, bronchial asthma, mucous colitis and peptic ulcer (2, 12). Most of this evidence has been obtained by clinical psychiatric and psychoanalytic methods. There is a danger in these clinical techniques that the discovery of particular personality traits may be influenced by the belief of the investigator. Too often there is a lack of control cases, or at least a lack of assurance that a method has been used which is uninfluenced by *a priori* expectations of the differences to be found between cases under study and controls. We do not deny the validity of subjective psychiatric and psychoanalytic methods when they are competently applied without particular bias. We wish, however, to emphasize the need, in addition, for the collection of evidence about personality features in the psychosomatic disorders by means of psychological methods which can be applied comparably to control groups.

The Rorschach technique can be used, not only as a method for clinical study, in which it shares the susceptibility to subjective bias mentioned above, but also as a standardized psychological experiment, by which results can be obtained which lend themselves to quantitative study. Evidence obtained in the latter manner may help to validate and give perspective to the evidence obtained by subjective personality study. The present report is that of an application of the Rorschach method to a group of individuals suffering from migraine headaches in comparison with other groups.

CLINICAL MATERIAL

The *migraine* group consisted of 50 individuals complaining of headaches having three or more of the following characteristics: periodicity, unilaterality, duration of a few hours to several days, accompanied by nausea and often vomiting, being preceded by visual scotomata or hemianopia, being preceded by localized numbness or paraesthesia, being related to menses (in the case of women), showing a family history of periodic headaches, and being relieved by ergotamine tartrate if administered early in the attack. Of course, clinical judgment entered into the diagnostic decision rather than a rigid interpretation of the criterion of three or more of these features, but this criterion is presented as a relatively objective way of drawing the line between migraine and non-migraine headaches. Doubtful cases were excluded from the series. No cases following head injury were included, nor ones with neurological abnormalities, excepting that some of the cases showed electroencephalographic abnormalities. Some cases had hypertension, and others had peptic ulcer in addition to migraine, while one patient had had three epileptic seizures during her life time. Others had had syncope during the course of migraine attacks. Many of the patients had been able to recognize association of their attacks with emotional stress. The individuals ranged in age from 15 to 55. There were 34 females and 16 males, in line with the usually reported predominance of females over males in this disorder (9). They included out-patients, private patients and medical confrères, thus covering a considerable range of the social and intellectual scale. Intelligence tests have not been done, but the clinical impression would indicate that, with a few individuals of low average intelligence and a greater number of very superior intelligence, the mean intellectual level would have been between high average and superior. This is in line with previous categorization of migraine sufferers as "among the most intelligent and industrious members of the community" (1). We have not yet attempted to correlate the Rorschach findings with other clinical, laboratory and psychological data in the same individuals within the series, but only to seek what features may be associated with migraine sufferers as a group.

Several control groups have been used. The first control group consisted of 25 individuals complaining of *headaches not diagnosed as migraine* and in which gross neurological disorders, such as cerebral neoplasm had been excluded. Ten of these showed sufficient evidence of psychoneurosis along with absense of any abnormal physical findings and with a direct connection between the headaches and emotional difficulties so that they were considered undoubtedly psychogenic. The other fifteen may have included several individuals in which the headaches were occurring largely for psychogenic reasons, but as the connection was not definitely established they have been considered as headaches of unknown cause. Some of these showed electroencepha-

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lographic abnormalities, the significance of which is not understood. One showed dilated ventricles of unknown origin on pneumographic study. Some might have been considered to fall in the group of "histamine" headaches. As with the migraine cases, these headaches have been grouped together for the purposes of this study, and not analyzed except for the division into those definitely psychogenic, and those of unknown etiology. They were all adults in the same age range as the subjects with migraine, 5 males and 5 females in the psychogenic group, and 5 males and 10 females in the unknown group.

A group of individuals *without* symptoms consisted of 50 persons from the age of 13 to 76. This group was drawn from acquaintances of the authors and happens to rank in the intelligence level of superior normal, as all excepting the two youngest were either university graduates or undergraduates, and the latter two, still in school, were of the same intelligence level as the university subjects. There were 25 males and 25 females.

Psychoneurotic controls were provided by 50 cases from the wards and out-patient clinics of the Montreal Neurological Institute and the Royal Victoria Hospital. The diagnosis was based on the presence of characteristic symptoms, the absence of significant physical disease, and a history of a relationship of symptoms to emotional stress, often not recognized by the patient. They included cases of anxiety neurosis, anxiety hysteria, hysteria, obsessive compulsive neurosis, and reactive depression, in random distribution, the first two being the most frequent. They were also in the age range of 15 to 55 and they included 26 males and 24 females.

Twenty-four patients with *brain disease* were used, including cerebral neoplasm, subdural haematoma and severe brain injury with positive neurological evidence of contusion, divided about equally between tumor and injury. These were 19 males and 5 females, all adults.

In the entire series there were 199 individuals, 96 males and 103 females.

OBJECTIVE RORSCHACH FINDINGS

Rorschach examinations were made and scored on all these individuals according to the system of the Rorschach Institute (3). No interpretations of individual records were made. Only scores were used which can be clearly defined in a standardized way, omitting rather vaguely defined items, such as "color shock" and "shading shock." When carried only to this stage, the technique can be considered as an objective psychological experiment.

A comparison was made between the migraine group and the control groups in regard to the levels of certain "ratings" and the incidence of many objectively scored "signs" which had previously been described (3, 5, 6). Descriptions of the "ratings" and "signs" which will be used in this report will be repeated for the convenience of the reader. First, however, an explanation should be given of the statistical procedure by which these particular "ratings" and "signs" were chosen out of the larger number which might have been used.

In order to avoid a bias from the authors' knowledge of personality characteristics previously described for these groups on clinical grounds, a mathematical selection was used. The levels of the "ratings" later to be described, and the incidence of all the "signs" used in a previous study (6), were determined for the migraine group, the various control groups, and for the entire series of 199 cases.

Comparisons among the "ratings" made by Fisher's method (with a "t" value greater than 2.042, corresponding with a P value less than .05, considered to be significant) indicated that some of the groups were significantly high in the levels of these ratings and that these ratings should be used in this study.

The incidence of the "signs" were compared by the method of Chi Square. Each group where inspection indicated a high incidence was compared against all the other groups to ascertain whether the apparently high incidence could be accounted for by chance. (A Chi Square value greater than 3.841, corresponding with a P value of less than .05, was considered to indicate significance.) In instances where two groups appeared to share a high incidence of a sign, another comparison was made after the significance of the incidence had been assessed in relation to all other groups except the one under study. It was then ascertained whether either one or both of these groups showed a significantly high incidence in comparison with all the other groups except the one other one also high in this characteristic. Those signs were used in this study which were found to be significantly high either in the migraine group or in a control group when compared either with all the other groups or with all other groups except one other group also high in the same characteristic.

Table I presents the levels of the ratings in each group as well as in the whole series, and the percentage incidenee of each of the signs showing a high incidence as determined above. Where an item is significantly high in comparison with all other groups bold face type has been used in the table. Where it is significantly high in comparison with all except one of the other groups, italics have been used. The features characteristic of migraine have been printed in bold face type in brackets.

Before the items are discussed which stand out as

TABLE I

RATINGS AND SIGNS FOUND CHARACTERISTICALLY HIGH IN AT LEAST ONE CLINICAL GROUP

	N.	Rorschach ratings: Instability Mean	Instability S. E.	Disability Mean	Disability S. E.	Percentages of several separate signs: All Dev.	All Fa.	All Delay	Card II Fa.	Card II Del.	Card VI Fa.	Card VI Del.	Card VII Fa.	Card VII Del.	Card IX Fa.	Card IX Del.	Rpt.	F + %	>75% W	All one way	1 R per card	Any one of last 3 signs
Migraine	50	9.8	± .97	5.6	±1.47	5.8	5.0	[13.4]	4.0	12.0	12.0	[26.0]	8.0	*16.0*	8.0	*24.0*	26.0	12.0	[36.0]	[28.0]	[30.0]	[56.0]
Other headaches (Psychogenic)	10	14.8	±4.37	9.7	±1.42	9.0	16.0	9.0	*20.0*	*20.0*	*30.0*	0.0	20.0	0.0	20.0	20.0	20.0	20.0	30.0	10.0	20.0	30.0
Other headaches (Unknown)	15	7.3	±1.68	7.5	±2.75	6.0	6.6	7.3	6.6	0.0	20.0	6.6	6.6	0.0	6.6	**40.0**	26.8	13.4	26.6	20.0	26.6	46.6
Other headaches (All)	25	10.3	± 2.1	8.4	±1.72	7.2	10.4	8.0	12.0	8.0	24.0	4.0	12.0	0.0	12.0	**36.0**	24.0	16.0	28.0	16.0	24.0	40.0
Superior healthy	50	3.6	± .66	1.1	± .75	4.0	1.2	6.8	0.0	4.0	4.0	10.0	0.0	12.0	4.0	10.0	6.0	0.0	8.0	4.0	2.0	14.0
Psychoneurotic	50	17.9	±1.53	8.3	±1.30	9.2	16.2	9.4	12.0	14.0	**36.0**	12.0	**26.0**	10.0	**34.0**	18.0	26.0	4.0	20.0	22.0	20.0	38.0
Brain disease	24	8.75	±2.42	**25.1**	±2.69	**11.6**	11.2	3.3	12.5	0.0	16.7	0.0	16.7	4.2	*20.8*	4.2	**71.0**	**52.0**	37.5	*29.1*	**37.5**	**66.6**
All groups	199	10.3	± .70	12.2	± .87	7.0	8.3	8.8	7.0	8.5	18.1	12.6	12.1	10.0	15.6	17.6	26.0	12.5	24.1	19.1	20.6	40.2

characteristic of particular groups, the meaning of the "ratings" and "signs" in Table I will be presented:

The "Rorschach Ratings" are objectively determined indices for which the scoring key has been presented in the Rorschach Research Exchange (6) and for which clinical and psychometric correlations have been presented in the American Journal of Psychiatry (7). In brief, they are both composite scores derived from many separate signs, in proportion to the incidence of these signs in psychoneurotic patients or in patients with brain disease when comparisons were made between these two groups and with normal controls. "Instability" was high (around 18) with neurosis and in post-traumatic patients with unstable personality background, and it tended to be higher in association with poorer performance on the Binet word list as well as with poorer prognosis for treatment. "Disability" was high (25-30) in the presence of brain disease or after head injury involving marked evidence of brain damage, and it tended to be higher in association with poorer performance on the span of digits test. A complete reiteration of the definitions and scoring values would be too space-consuming, and the investigator wishing to make use of these ratings is referred to the original paper (6).

The definitions of most of the separate "signs" incorporated into Table I can conveniently be repeated.

The sign, *Deviation,* requires a rather lengthy definition (6), and since there was only one instance where it proved characteristic, *i.e.,* for brain disease, and since this instance is not of importance to the characteristic patterns to be discussed later, this definition will not be repeated.

Failure is scored if a card is put down without any interpretation. This sign has previously been labelled "refusal" or "rejection" (3) (p. 388) and was applied to this type of performance on any card. Under "failure" we are concerned with the particular card on which it occurs. *All Failure* in Table I refers to its occurrence on any card, while failures on particular cards, such as II, VI, VII, and IX, are recorded in the table as sub-columns under the appropriate card.

Delay is scored if the reaction time to any card is more than 20 seconds longer than the mean reaction time to all cards. When a card has been failed it is not scored as Delay nor included in the mean reaction time. As with Failure, Delay is recorded in Table I when it occurred in any Card (*All Delay*), or where it occurred in a particular card.

Rpt. stands for *Repetition* as defined by Piotrowski (5). This refers to the perseveration of the same response to several ink blots. It can be scored if three similar responses are given in a record without regard to form (3) (p. 332).

F + % is also a sign defined by Piotrowski (5). It indicates that the percentage of good form responses in a record is below 70.

> 75%W was scored when more than 75% of the responses in a record were whole (W) answers.

All one way describes the performance of keeping all the cards in the same upright position in which they were given to the subject.

1 R per card refers to the limitation by the subject in his performance to only one response for each card.

The last column in the table is used to indicate the incidence with which at least one of these last 3 signs occurred, since, as will be mentioned later, these 3 signs have a somewhat similar incidence and meaning.

In order to illustrate the patterns of signs which stand out as characteristic of each clinical group, the findings of Table I have been transposed to graphic form in figure 1. The bar graphs are at heights proportionate to the levels of the "ratings" and the incidences of the separate "signs" approximated to the nearest whole number. The items found to be high to a mathematically significant degree are indicated by the type of fill-in of the bars, corresponding with the special printing in Table I.

The legitimacy of the comparison with all other groups might be questioned if a diagnostic validity for these signs were being claimed. Such, however, is not the aim of this study, nor indeed would a diagnostic specificity be expected by the authors. If such a diagnostic specificity were sought, a much larger series of random diagnostic problems would be required, such as serial admissions to a hospital ward or out-patient department. We have employed the statistical devices already described in order to assure that the items selected as "characteristic" were chosen by mathematical comparison and not from *a priori* reasoning. All that is claimed for the items which stand out in figure 1 are that they are found to be higher in that particular group than could be accounted for by chance when a comparison was made with the other groups under study.

A glance at figure 1 indicates that the superior healthy group does not show any features significantly higher than all other groups, but that migraine, other headaches, psychoneurosis, and brain disease each present some significantly high items.

For brain disease, these items include: the "Disability Rating," "deviation" on some card, "failure" on Card IX, "repetition," "F+%," greater than 75% whole answers, holding the cards one way up, giving one response per card, and one out of the last three signs.

For psychoneurosis, they include: "Instability Rating," "failure" on some card, and especially "failure" on Card VI, IX, or VII.

For headaches other than migraine, "delay" on Card IX seems to stand out.

In the group which is the main object of this study, that of individuals with migraine headaches, the following items are significantly high: "delays" on any card, especially on Card VI, IX or VII, where psychoneurotics tend to fail; giving more than 75% whole answers; holding the cards one way up; giving one response per card; and one out of the last three signs, these last four features being shared with brain disease.

INTERPRETATION

Inasmuch as the Rorschach method has a contribution to offer in a qualitative clinical way which is lost when its results are broken down into separate clearly definable elements, it should not be assumed that the features which have been pointed up in the foregoing section are the only Rorschach features characteristic of the groups under study. Further interesting material might be derived if the Rorschach records were studied

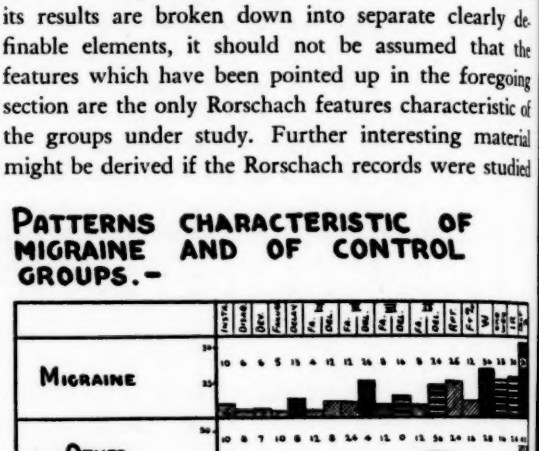
PATTERNS CHARACTERISTIC OF MIGRAINE AND OF CONTROL GROUPS.-
MIGRAINE
OTHER HEADACHES
PSYCHONEUROSIS
BRAIN DISEASE
SUPERIOR HEALTHY
ALL GROUPS
not significantly different from all other groups together -
significantly higher than all other groups together -
significantly higher than all other groups together with the exception of the one other group also high in the same feature

FIG. 1. Graphic illustration of findings in Table I.

carefully from a subjective interpretive point of view as well as from an objective statistical one.

For example, one individual gave exclusively whole answers on Card I, and from Card II on, apparently with "color shock" to this second card, resorted to the opposite extreme of over-emphasis on tiny detail. Such a performance was not reflected in any of the "objective" signs being used to pigeon-hole distinct types of performance. Many more examples might be given, but these would have to be selected from recognition of a similarity to previously reported clinical personality features. They would defy simple quantitative treatment, and they would be open to the possibility of subjective distortion, the avoidance of which has been one of the main aims of this investigation.

For these reasons there will not be an extensive attempt to use our data in the light of subjective Rorschach interpretation. To link up our findings with previously reported clinical studies, however, some discussion might be made of the features in Rorschach performance found to be high in migraine. These items are such that they can be discussed, at least superficially, in a manner that will be understandable to an individual unversed in Rorschach theory or inexperienced with the complexities of the method.

One can first of all compare the migraine "delays" with the psychoneurotic "failures." The migraine patients frequently have difficulties at the same points in the test where the psychoneurotics have difficulties. However, whereas the latter patients commonly give up and refuse to make any response, the migraine patients persist and finally give an answer. They have a greater persistence towards success in spite of difficulty.

It may be correct to class migraine as a "neurosis," as has been done by several authors (4, 9, 10), provided one is focussing one's attention on the fact that migraine sufferers and patients diagnosed as psychoneurotic have *certain emotional difficulties in common*. On the other hand, according to our evidence, such a classification overlooks the fact that migraine subjects do not *react* to these difficulties in the same way. The same may be true about other psychosomatic disorders. It is also noteworthy that the migraine individuals, as a group, were not high in the "Instability Rating" found to be characteristically high in psychoneurotic subjects as a group.

With regard to the type of emotional difficulty shared with psychoneurotics, it appears necessary to mention that Card VI, which presented most difficulty to both groups, is one which is considered to stimulate sexual associations. The difficulty on this card, then, is in line with the many reports of difficulties in sexual adjustment as a frequent accompaniment of migraine (4, 8, 9, 11, 13).

Card IX, which is the second most difficult card for migraine sufferers and psychoneurotics, as well as the most difficult one for persons with non-migraine headaches, is one in which color effects and shading effects are added together to produce an apparently cumulative effect of "color shock" and "shading shock," even for individuals who may not manifest evidences of such "shock" when suddenly confronted by bright color or pronounced shading alone. This card, then, may be tripping up individuals who do not get a "headache" until snowed under by an accumulation of emotional stresses.

The over-emphasis on whole answers can be understood as an excessively systematic approach, in which the individual either fails to analyze the situation before him into its component details, or else, although able to make such an analysis, does not choose to do so and strives instead for an all-embracing response. Especially when coupled with the persistence towards success already mentioned, this feature is in keeping with the many clinical reports of ambitious, perfectionistic personalities among migraine patients (4, 9, 13). The over-emphasis on whole answers was present in only 36% of our migraine patients. Wolff (13) reported 41 out of 43 of his migraine subjects to be over-conscientious and perfectionistic. The apparent discrepancy should be considered in the light of the introductory remarks in this section on interpretation. Over-conscientiousness and perfectionism can be manifested by other Rorschach characteristics which are lost by this objective quantitative approach.

The feature of holding all cards in the upright position, in spite of instructions which lead most subjects to experiment with viewing the cards in various positions, can be understood as a tendency to accept things in the given, or conventional manner, instead of experimenting with varied points of view. Such a conventionality has been described for migraine sufferers (8). We have also seen patients with migraine who adhered inflexibly to non-conventional or radical views.

The similarly self-imposed limitation of only one answer per card can be seen as associated with a tendency to assume that there can be only one right answer, an attitude making for intolerance and criticism of opposing views (8, 13).

These last three signs represent different indications of rigidity in handling the test, in line with the obsessive-compulsive inflexibility which has been described as characteristically associated with migraine (1, 8, 13). The results with superior normal adult controls show that only 2 to 14% of these persons make any assumptions that they *must* give all whole answers, hold the cards the way they were given to them, or give just one right answer for each card. In contrast to this, 28 to 56% of migraine sufferers and 29 to 66% of persons with brain disease or injury make such assumptions about the test.

Our data, as analyzed so far, do not tell us whether these obsessive-compulsive features in migraine have an organic basis, or whether such features, even when manifested by patients with brain disease, represent a compensatory striving for feelings of inferiority due to recognized inefficiency. Further Rorschach studies at various stages in the life history of migraine patients and other members of their families, along with thorough clinical and laboratory data including electroencephalographic and electromyographic studies, as well as other psychological tests, might help to shed further

light on the relationship between characteristic personality features and the physiological mechanism of the symptoms. The features which we have found to be present in high incidence in association with migraine would appear to be either a contributing cause, a common secondary result, or a manifestation of factors more basic which produce both migraine headaches and a typical personality.

The interpretations which are derivable from the outstanding features in figure 1 are summarized in Table II, which points up the chief psychological characteristics which our method of analysis has indicated to be present in association with migraine, other headaches, psychoneurosis and brain disease.

TABLE II

INTERPRETATIONS OF OUTSTANDING ITEMS IN FIGURE 1

MIGRAINE

1. Hesitation but persistence in the face of emotional difficulty.
2. Sexually disturbing stimuli constitute an important difficulty.
3. An accumulation of emotional stresses is also hard to handle.
4. Overly systematic, perfectionistic.
5. Tendency to accept things as given.
6. Tendency to limit performance, probably from assumptions which also lead to intolerance.
7. Presence of at least one of the last three features of inflexibility in *over half* of all cases.

OTHER HEADACHES

1. Hesitation but persistence in relation to an accumulation of emotional stresses.

PSYCHONEUROSIS

1. A composite of characteristics expressed by the "Instability Rating."
2. Giving up easily in the face of emotional difficulty.
3. Sexually disturbing stimuli constitute an important difficulty.
4. An accumulation of emotional stresses is also hard to handle.

BRAIN DISEASE

1. A composite of characteristics expressed by the "Disability Rating."
2. Deviation in form perception at times.
3. Giving up under an accumulation of emotional stresses.
4. Perseveration.
5. Poor form perception.
6. Tendency towards over-systematization or perfectionism, or else an inability to analyze total situations.
7. Tendency to accept things as given.
8. Limitation of performance either from assumptions or inability.
9. Presence of at least one of the last three features of inflexibility or inability in *two thirds* of all cases.

CONCLUSIONS

The comparison of these interpretations with the personality features found to be associated with migraine by clinical study has indicated that most of the outstanding features found by clinical methods have also been pointed up by our independently applied quantitative psychological technique. One important feature reported to be present to clinical investigation has not yet been confirmed. This is the harboring of strong resentments as a characteristic particularly associated with migraine (11, 13). Our method of approach, does not, of course, disprove the validity of such a finding. There may be no quantitative Rorschach counterpart for this feature among the scores which we assessed. Or if there were such a score, it may have been present in the controls to a degree such that it did not stand out in the migraine group.

The conclusions of this study, then, are: that a quantitative use of the Rorschach method has given independent confirmation that certain personality features are associated with migraine to a greater degree than would be accounted for by chance; that these personality features include several which have been previously reported from clinical psychiatric and psychoanalytic study, namely: persistence towards success, difficulty in sexual adjustment, perfectionism, conventionality, intolerance, and in general, obsessive-compulsive features; and that the harboring of strong resentments also reported from clinical psychiatric study has not yet been confirmed. In addition it has been shown that psychoneurotic patients and brain disease patients, as groups, also have certain distinct personality features. Migraine shares some characteristics with each group, but does not resemble either of them in their most characteristic composite Rorschach ratings.

SUMMARY

Rorschach records have been made of 50 individuals with migraine headaches, 10 individuals with undoubtedly psychogenic headaches, 15 individuals with headaches of unknown origin, 50 symptom-free individuals of superior intelligence, 50 miscellaneous psychoneurotic patients and 24 patients with brain tumor or injury. These records have been analyzed for objectively defined signs. The signs which are significantly associated with migraine, with psychoneurosis, and with brain disease have been determined. The migraine group tends to show delay on the same cards on which the

psychoneurotic group fails, especially on Card VI. The migraine group also has a high percentage of records in which over 75% are whole responses, in which the cards are all held upright as presented to the subject, or in which only one response is given per card. The latter three features are shared by the group with brain disease. When an interpretation is added to the objective statistical study, the items associated with migraine can be seen as representing persistence toward success, difficulty in sexual adjustment, perfectionism, inflexibility, conventionality and intolerance. Some of these are obsessive-compulsive features, and all have been found in migraine by clinical personality study. "Instability" and "disability" ratings were not significantly abnormal in the migraine group. This would indicate that when all the quantitative Rorschach signs most characteristic of psychoneurosis or of brain disease are taken into consideration, the migraine subjects are not essentially more "neurotic" or more closely allied to subjects with brain disease than an unselected group, even though they have shown some features in common with psychoneurotics and others in common with individuals suffering from brain disease.

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NOTICE

Due to an unprecedented demand for back volumes of the journal, PSYCHOSOMATIC MEDICINE, the issues listed below are out of print. Anyone who wishes either to donate or sell these numbers will please communicate with the Editorial Office.

Volume I, No. 4, October 1939
Volume V, No. 1, January 1943
V, No. 2, April 1943
V, No. 4, October 1943
Volume VI, No. 1, January 1944
VI, No. 2, April 1944
Monographs: White, Cobb & Jones: Mucous Colitis
Kardiner: The Traumatic Neuroses of War

THE RORSCHACH PERFORMANCE WITH NEUROCIRCULATORY ASTHENIA

W. D. ROSS, MAJOR, R.C.A.M.C.*

An application of the Rorschach method in an objective quantitative manner, to ascertain the association of particular personality traits in relation to psychosomatic entities, has already been reported as carried out on a group of 50 individuals with migraine headaches in comparison with several control groups (5). The present report comprises an extension of such an application to a group of 50 individuals presenting the symptoms of neurocirculatory asthenia.

CLINICAL MATERIAL

The subjects in this study included 30 soldiers serving in the Canadian Army and 20 men seen during selective service medical examinations regarding fitness for army service. They were selected by their presentation of complaints, in the absence of cardiac disease, with the following symptoms predominating: intolerance to effort, breathlessness, fatigue, palpitation and precordial pain or constriction, and with excessive sweating, nervousness, dizziness, headaches and sleep disturbance often being present in addition. Many of them had tachycardia at rest or with slight exertion, cold moist hands, tremor, and poor general physique and posture, but the criterion for inclusion in the group was that of the symptom picture rather than the physical findings. They ranged in age from 19 to 33; all were male.

The entire group of neurocirculatory asthenia cases was divided into two sub-groups on the basis of clinical considerations which have been outlined by the author in a previous paper on "effort syndrome" (4). In brief, the criteria for the subdivision consisted of such evidences in the history as, for example, the presence or absence of early neurotic features, of chronicity of symptoms, and of timid personality since childhood. The characteristics of the two groups are summarized in Table I, which is derived from the effort syndrome paper (4). In the previous paper the two groups were described, for the sake of practical emphasis, as "has beens" and "never wases," but they will be referred to in this report as simply "cases of recent onset" and "long-standing cases." The division probably corresponds to similar divisions in regard to the presence or absence of "constitutional inferiority" except that no assumption is made here as to whether the difference is "constitutional" or not.

TABLE I

SUB-GROUPS OF NEUROCIRCULATORY ASTHENIA

LONG-STANDING CASES (*Never-was* courageous—"faint-hearted")	CASES OF RECENT ONSET (*Has been* courageous—"lost heart")
Several "neuropathic" traits: Family history, enuresis, stuttering, somnambulism, tics, phobias, fainting, nail biting.	No "neuropathic" traits.
Broken home or nervous, apprehensive parent.	Normal family setting.
Fear of darkness, requiring night light.	Not fearful as a child.
Avoidance of fights, rough sports, team games.	Full participation in sports.
Reactions to illness usually excessive.	Reactions to illness normal.
May be total abstainer.	Adopted habits of companions.
Inactive sex history.	Active sex history.
Sedentary occupation with over-conscientiousness.	Any occupation.
Long standing family history of heart disease.	May be recent family history of heart disease.
Physician's warning in childhood.	Physician's statement recently.
Symptoms long-standing with activity ordered accordingly.	Onset after physical illness, physical or emotional stress, sudden change from sedentary activity or disappointment.

Several control groups have been used. One group consisted of 30 soldiers and 20 selective service examinees, all of whom had been considered free from psychiatric disability by an examining psychiatrist. The other groups have been described in the report of the migraine study (5). They included 50 healthy individuals of superior intelligence, mostly civilians, 50 civilian psychoneurotic patients, 24 patients with brain disease, 50 migraine sufferers, and 25 individuals with non-migraine headaches.

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OBJECTIVE RORSCHACH FINDINGS

As in the migraine study, the Rorschach examinations were made and scored according to the system of the Rorschach Institute (3). As before, the records were analyzed for certain objectively scored "ratings" and "signs."

The levels of the "ratings" and the incidences of the "signs" were ascertained in the group of neurocirculatory asthenia patients as a whole, in the two sub-groups, in the new group of controls, and for the entire 299 cases involved in both investigations. These findings are recorded in Table II, in which the significantly high findings have been placed in italics or brackets. The same statistical criteria were used as for the migraine study and this Table II is comparable to Table I in the migraine study (5).

To illustrate the patterns characteristic of the groups in the present study, and to afford a comparison with figure 1 in the migraine study, the findings of Table II in the present study have been transposed to graphic form in figure 1. The bar graphs are at heights proportionate to the nearest whole numbers in Table II. The items found to be significantly high are indicated by the type of fill-in of the bars.

A glance at figure 1 indicates that the new control group does not show any features significantly higher than all the other groups, whereas the neurocirculatory asthenia cases, both as one group and when divided into two sub-groups, present several significantly high items. These items are best considered in relation to the items illustrated as high in migraine, psychoneurosis, and brain disease in figure 1 of the migraine article (5).

The neurocirculatory asthenia cases show, in common with psychoneurosis, a high "Instability Rating" and a high incidence of failures. In the case of neurocirculatory asthenia these failures occurred most often on Card VII, but also on Card IX, and not significantly often on Card VI. In psychoneurosis of miscellaneous civilian types Card VI gave the most failures, and Card VII fewer than Card IX. The "Instability Rating" in neurocirculatory asthenia (18.2 ± 1.65) is essentially the same as that in the miscellaneous civilian psychoneurotics (17.9 ± 1.53), while the incidence of all failures (18.4%) was the most significantly high single finding for the neurocirculatory asthenia group as compared to all other groups ($\chi^2 = 55.7$, with P much less than .01).

The neurocirculatory asthenia cases also show, in common with migraine and brain disease, an over-emphasis on whole answers, a limitation to one response per card, and any one out of the three signs, over-emphasis on wholes, keeping the cards one way up, or giving only one response per card.

TABLE II

RATINGS AND SIGNS AS FOUND IN NEUROCIRCULATORY ASTHENIA, THE SUB-GROUPS AND CONTROLS

	N.	Rorschach ratings: Instability Mean	Instability S. E.	Disability Mean	Disability S. E.	Percentages of several separate signs: All Dev.	All Fa.	All Delay	Card II Fa.	Card II Delay	Card VI Fa.	Card VI Delay	Card VII Fa.	Card VII Delay	Card IX Fa.	Card IX Delay	Rpt.	F ÷ %	75% W	All one way up	1 R per card	One of last 3 signs
Neurocirculatory asthenia (all cases)	50	[18.2]	[±1.65]	9.7	±1.10	7.2	[18.4]	7.6	10.0	8.0	22.0	10.0	[36.0]	10.0	[32.0]	14.0	16.0	10.0	[42.0]	28.0	[54.0]	[68.0]
N. C. A. (long-standing cases)	37	21.6	±1.92	10.6	±1.04	7.5	20.0	7.0	10.8	8.4	24.3	5.4	45.8	8.4	37.9	8.4	18.9	10.8	40.5	35.1	59.4	72.9
N. C. A. (cases of recent onset)	13	10.15	±1.91	5.7	±2.06	6.9	7.7	12.0	0.0	7.7	15.4	23.0	7.7	15.4	15.4	30.8	7.7	7.7	46.2	7.7	38.4	53.8
Controls: Soldiers and recruits	50	10.9	±1.16	6.2	±1.03	6.4	6.6	7.4	8.0	6.0	6.0	12.0	10.0	0.0	4.0	14.0	2.0	2.0	24.0	10.0	26.0	38.0
All cases (including ones in migraine study)	299	11.9	± .62	10.8	± .76	6.9	9.7	8.0	7.7	8.0	16.7	12.0	16.7	8.3	16.7	16.7	20.4	6.3	27.1	19.1	27.1	44.5

When the neurocirculatory asthenia cases are subdivided into two groups, the group of long-standing cases shows the neurotic features even more markedly, even to having a significantly high number of failures on Card VI, although still not as high as on Cards VII and IX. The "Instability Rating" (21.6 ± 1.92) is definitely in the neurotic range and all failures (20.0%) are high. The features held in common with migraine and brain disease are also high. Among these, the over-emphasis on wholes, while significant, is lower than in cases of recent onset; but the other features held in common with migraine are considerably higher in long standing cases.

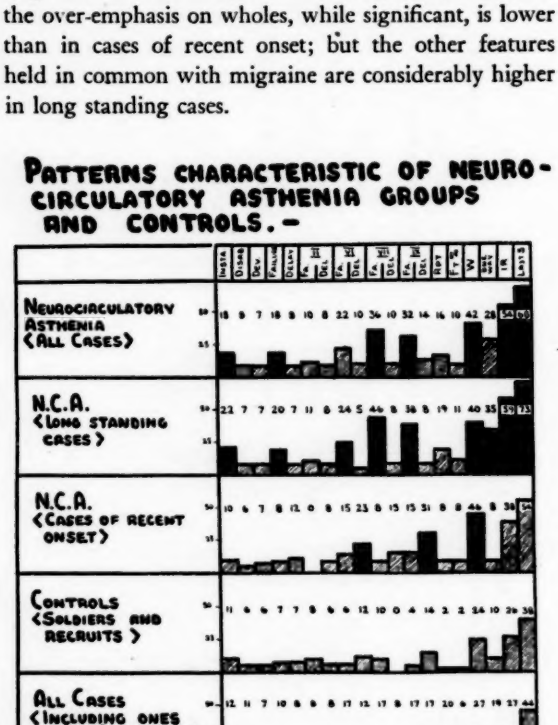
PATTERNS CHARACTERISTIC OF NEURO-CIRCULATORY ASTHENIA GROUPS AND CONTROLS.-
NEUROCIRCULATORY ASTHENIA (ALL CASES)
N.C.A. (LONG STANDING CASES)
N.C.A. (CASES OF RECENT ONSET)
CONTROLS (SOLDIERS AND RECRUITS)
ALL CASES (INCLUDING ONES IN MIGRAINE STUDY)
not significantly different from all other groups together.-
significantly higher than all other groups together.-

FIG. 1. Graphic illustration of findings in Table II.

In the cases of recent onset, the characteristic features for psychoneurosis and for long-standing neurocirculatory asthenia cases are not evident. For example, the "Instability Rating" is normal (10.15 ± 1.91) and there are no more failures than in all other cases. Instead, we find certain features shared particularly with migraine: delays on Cards VI and IX and over-emphasis on whole responses.

INTERPRETATION

The introductory remarks to the interpretation section of the migraine article concerning the limitations of the quantitative approach are equally applicable here but need not be reiterated. Similarly, it should be realized that only a superficial interpretation of the findings for neurocirculatory asthenia is being given, but at such a level certain understandable comments can be made to tie in with the results of clinical personality study.

The similarities to the miscellaneous psychoneurotic group are not surprising in view of the considerable evidence that most cases with symptoms of neurocirculatory asthenia are describable under psychiatric diagnoses, most commonly anxiety state, depression, psychopathic personality, or hysteria (2).

The most significant item of all, the tendency to give up easily under stress, would emphasize the particular neurotic characteristic possessed by the sub-group among neurocirculatory asthenia cases described by Wittkower and his associates as "hysterical quitters" (6).

The majority of patients studied by Wittkower, however, showed over-conscientiousness and over-scrupulousness, and preoccupation with problems of morality, self-regard, religiosity, patriotism, duty, responsibility and self-sacrifice, while many of them had had phobic symptoms at some time. In short, they showed obsessive-compulsive inflexibility in line with the inflexibility which our cases have manifested in common with migraine and brain disease, and which was not a common feature in our group of mixed neurotics.

Our cases, then, as a group, have shown a combination of obsessional difficulties which make life difficult for them, and a tendency to give up in the face of these difficulties. In individual cases, varying amounts of these two features may be present, with the individual resembling the over-conscientious type or the "hysterical quitter" in varying degrees.

The points of differentiation from miscellaneous civilian neurotics are worth noting in particular. Failure on Card VII, rather than on Card VI, is especially important. As mentioned in the migraine report, Card VI is one which is considered to stimulate sexual associations. This provides difficulty, resulting in failure to give an interpretation, in a larger number of civilian psychoneurotics than in cases with neurocirculatory asthenia. This suggests that, although sexual conflicts may be important in a proportion of cases of neurocirculatory asthenia, they are not as important as in a group of civilian neurotics, and another type of conflict may be more important altogether. It seems possible that this may be a conflict surrounding the instinct of self-preservation rather than the sexual drive. The nature of Card VII gives only slight lead to the special psychology of neurocirculatory asthenia. It is a card which commonly evokes responses in which the shading is used to give a diffusion effect of clouds or smoke, interpreted as evidence of some free-floating

anxiety. It is possible that the rejection of this card by patients with neurocirculatory asthenia represents a failure on their part to accept consciously the degree of anxiety which they have reason to possess. One of the reasons for the earlier reluctance to consider these patients as neurotic has been the fact that they often deny anxiety or fail to see the connection of their symptoms with anxiety producing circumstances (1).

The sub-grouping of neurocirculatory asthenia cases indicates the long-standing cases to be more "neurotic" and more inclined to give up easily, but also definitely possessing the obsessive-compulsive features which mark them as a distinct type of neurosis.

The cases of recent onset, on the other hand, more closely resemble cases of migraine than cases of psychoneurosis. They show the delay, with persistence towards success, and a perfectionistic striving for the whole picture. Two of the cases of recent onset in our series were ones who "lost heart" after failing to complete successfully their officers' training course. The development of the symptoms in relation to frustrated ambition is easily understandable in these individuals who were of the perfectionistic, ambitious type.

The interpretations which are derivable from the outstanding features in figure 1 are summarized in Table III, which is comparable with Table II in the migraine article. This table points up the chief psychological characteristics which our method of analysis has shown to be present in neurocirculatory asthenia cases as a group, and in the two sub-groups into which we have divided them.

CONCLUSIONS

The conclusions of this study are: that a quantitative use of the Rorschach method has given independent confirmation that certain personality features are associated with neurocirculatory asthenia to a greater degree than would be accounted for by chance; that these personality features include several which have been previously reported from clinical psychiatric study, namely: features characteristic of psychoneurosis, especially a tendency to give up easily under stress ("hysterical quitters") and obsessive-compulsive features; that sexually disturbing stimuli do not appear to cause as great a difficulty for neurocirculatory asthenia cases as for miscellaneous civilian psychoneurotics, but that other anxiety producing stimuli are handled with even greater difficulty; that when the neurocirculatory asthenia cases are divided into two groups, the more long-standing cases are found to possess the neurotic features to a more marked degree, while the cases of more recent onset show a greater similarity to cases of migraine with persistence towards success and ambitious perfectionism.

TABLE III

INTERPRETATIONS OF OUTSTANDING ITEMS IN FIGURE 1

NEUROCIRCULATORY ASTHENIA (ALL CASES)

1. A composite of characteristics expressed by the "Instability Rating" (in common with psychoneurosis).
2. Giving up easily in the face of emotional difficulty (in common with psychoneurosis).
3. Sexually disturbing stimuli do not constitute as important a difficulty as for miscellaneous psychoneurotics.
4. Another type of anxiety evoking stimulus is difficult to handle (more so than miscellaneous psychoneurotics).
5. An accumulation of emotional stresses is also hard to handle (in common with psychoneurosis and migraine).
6. Overly systematic, perfectionistic. (In common with migraine and brain disease)
7. Tendency to limit performance. (In common with migraine and brain disease)
8. Presence of at least one out of three features of obsessive-compulsive inflexibility in over *two-thirds* of all cases. (In common with migraine and brain disease)

N.C.A. (SUB-GROUP OF LONG-STANDING CASES)

1. The composite of characteristics expressed by the "Instability Rating" (in common with psychoneurosis).
2. Giving up even more easily than all cases in the face of emotional difficulty (more so than in psychoneurosis).
3. Sexually disturbing stimuli constitute an important difficulty (in common with psychoneurosis and migraine).
4. Another type of anxiety evoking stimulus is difficult to handle (more so than miscellaneous psychoneurotics).
5. An accumulation of emotional stresses is also hard to handle (in common with psychoneurosis and migraine).
6. Accepting things as given. (In common with migraine and brain disease)
7. Limitation of performance. (In common with migraine and brain disease)
8. At least one out of three features of obsessive compulsive inflexibility in *almost three-quarters* of all cases. (In common with migraine and brain disease)

N.C.A. (SUB-GROUP OF CASES OF RECENT ONSET)

1. Hesitation but persistence in the face of emotional difficulty (in common with migraine).
2. Sexually disturbing stimuli constitute an important difficulty (in common with migraine and psychoneurosis).
3. An accumulation of emotional stresses is also hard to handle (in common with migraine and psychoneurosis).
4. Overly systematic, perfectionistic, or else an inability to analyze total situations (in common with migraine and brain disease).

SUMMARY

Rorschach records have been made of 50 individuals presenting the symptoms of neurocirculatory asthenia. These have been compared with the records of 50 soldiers and selective service examinees considered to have no psychiatric disability after short interview,

and with 199 other records as follows: 50 symptom-free civilians of superior intelligence, 50 miscellaneous civilian psychoneurotic patients, 24 patients with brain disease, 50 individuals with migraine headaches, and 25 individuals with other headaches. The neurocirculatory asthenia group shows in common with the miscellaneous psychoneurotic group a high level of "Instability Rating" (18.2 ± 1.65 in neurocirculatory asthenia, 17.9 ± 1.53 in miscellaneous neurosis, and $11.9 \pm .62$ for all 299 cases). The failure to respond to a card is the most significantly high item among the neurocirculatory asthenia cases. The failures, however, tend to take place most commonly on Card VII in neurocirculatory asthenia rather than on Card VI as in the mixed neurotics. The neurocirculatory asthenia subjects also show an even greater tendency to overemphasize whole answers and to give only one response per card than did the migraine and brain disease subjects whom these signs have appeared previously to characterize at least partly. When an interpretation is added to the objective statistical analysis, the Rorschach features characteristic of neurocirculatory asthenia are seen to represent a tendency to give up easily in the face of difficulties, and the presence of an obsessional conscientiousness which makes their problems appear more difficult to them than they need be. When the cases are divided according to chronicity, the more long-standing cases show the tendency to give up readily most markedly, while those of recent onset are a little higher in the obsessional conscientiousness. The type of difficulties most important for the neurocirculatory asthenia group is suggested to be other than that of sexual conflicts which are relatively more important in the mixed group of civilian neurotics.

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NOTE

Dr. Roy G. Hoskins, President of the American Society for Research in Psychosomatic Problems and an editor of the journal, PSYCHOSOMATIC MEDICINE, has been selected as the Salmon Memorial Lecturer for 1945. Dr. Hoskins is Research Associate in Physiology Harvard Medical School; Director, the Memorial Foundation for Neuro-Endocrine Research, Boston, Massachusetts; and Director of the Worcester State Hospital. He has devoted much of his time to research on endocrine disturbances in mental disease and is widely known for his contributions to neuro-endocrinological and physiological fields.

The topic of his lectures will be "The Biology of Schizophrenia." These will be given at the Academy of Medicine in New York, November 2nd, 9th and 16th.

RORSCHACH METHOD AND PSYCHOSOMATIC DIAGNOSIS

Personality Traits of Patients With Rheumatic Disease, Hypertensive Cardiovascular Disease, Coronary Occlusion, and Fracture

CAMILLA KEMPLE

INTRODUCTION

Rorschach studies of patients between the ages of 15 and 50 admitted to the Presbyterian Hospital with diagnoses of rheumatic disease, hypertensive cardiovascular disease, coronary occlusion, and fracture show that certain personality constellations are characteristic for the several illness groups. In the diagnosis of personality the Rorschach method focuses on the experiential level of behavior, on the underlying mental and emotional frame of reference according to which an individual interprets his environment and reacts to it. Interpretations of patients records have been made according to a standardized procedure which endeavors to describe the outstanding features for each case rather than to cover a given list of factors. The number of cases has not been sufficient in all the groups to yield statistical validation. The trends, however, are unquestionably significant and the agreement with findings of previous research offers additional validity.[1]

RHEUMATIC DISEASE

A woman, aged 38, was admitted to the hospital with a diagnosis of rheumatic heart disease. The personality revealed by the Rorschach test did not resemble that of a patient with rheumatic disease. The interpretation reads as follows:

Case 61-A: The subject has average intelligence. She is extremely constricted in experience, inhibiting both reflective inner life and outward expression of feelings. She strives for a compulsive intellectual control but is easily blocked. Traumatic experiences seem to have left her in a severe anxiety state. Guilt and anxiety about herself are marked. There is some free play of instinctive drives, which, in the absence of any mature creative inner life, implies a rather infantile personality. Aggressive impulses are manifested but the lack of affective self expression, the emphasis upon formal, intellectual control, and the frequent blocking, suggest that the aggressiveness is given only indirect expression through negativism, childish stubbornness, and the like.

What was unusual about this picture was the strength of aggressive drive, the rigid resistance to any expression of feeling, the conspicuous evidence of trauma, anxiety and guilt. This patient was later discovered to have a heart condition of luetic rather than of rheumatic origin.

Rorschach tests of patients with rheumatic disease show a dominant passivity and lack of aggressive drive. Many of these subjects are active, energetic, and some are even compulsively industrious. But they are not motivated by any strong ambitions for power or success. They do not identify with strong or dominating figures but in most cases with weak, dependent figures. Many of the men show feminine identifications, a confusion about their sexual role, with feelings of sexual inadequacy.

One, for example, said of one of the blots, "Two funny guys. Women's feet on them. If they had man's feet they'd be all right."

The men often express a sense of being burdened down by responsibilities which they feel are too much for them. Women in this illness group more often manifest a general attitude of helplessness and dependence. Instinctive weakness and repression, infantility and oral needs prevail among both sexes.

The following excerpts from the Rorschach report on a 34 year old man illustrate a typical rheumatic personality:

Case 29-RHA: His dominant attitude toward life is passive. He is extremely dependent upon the opinions of others and feels hopeless about asserting his individuality. He is cynical and has some tendency to ridicule, as a defense against his passive self repression. He feels weak, inadequate, unequal to an aggressive masculine role. He would like to be a child, to be treated like a child. . . . . He is frequently depressed, alternating between blaming the world and self blame.

None of these patients can find any satisfactory outlet for hostility even though many of them feel acutely hostile and resentful toward pressures in their environment. The satisfactions of creative thought and fantasy are undeveloped in most of them, adding to their dependence and emotional lability. Nearly all are hysterically extratensive or constricted with hysterical tendencies. The underlying emotional hysteria makes them afraid to express strong feelings for fear of losing control of themselves. This attitude is well described by one patient who said repeatedly in interviews with

[1] Dunbar, Flanders: Psychosomatic Diagnosis. New York, Paul Hoeber, 1943.

the psychiatrist, "I can't let off any steam. I just choke it up. . . . . I hold on tight and I can't let loose. I don't know what would happen if I did." Occasional demonstrations of negativism, suspicion, or of paranoid ideas are the strongest expressions of hostility found in these patients. Characteristically they are masochistic rather than sadistic; some are conspicuously self-defeatist and some clearly show specific death wishes.

When patients with rheumatic disease are divided according to the duration and severity of their illness, the most incapacitated invalids were found to be the weakest and most repressed patients instinctively, and the weakest and most undifferentiated emotionally. A second group had also been seriously ill off and on for a long time but constantly resisted invalidism and managed to do strenuous housework or hold jobs between hospitalizations. These subjects show much more instinctive vitality and more differentiated and controlled emotional responses. In a few of these cases obsessive-compulsive defenses are apparent.

One 28 year old woman in this second group had been in and out of the hospital all her life. She had nevertheless managed to marry twice and bear five children whom she supported almost entirely by her own earnings as a waitress. When seen in the hospital she had just decided to leave her second husband. She had "made a mess" of her life, she said, but she was not going to let her mistakes ruin her children's lives. Apparently identification with her children helped to counteract her own dependence needs. She was going to get out of this hospital, she said, "and show the world a thing or two." Her fighting spirit is revealed in the Rorschach test along with the weaknesses which made her life a "mess":

Case 159-RHB: Intelligence is average. A lively and vivacious person, she is also childish and hysterical with no stabilizing inner life, no reflective or imaginative resources. Defenses are weak. She is not introspective, has little awareness of what is going on inside herself, nor is she very sensitive to what is going on around her, showing little refined adaptation. Although she tends to be egocentric and impulsive, she is capable of emotional adaptation and is fairly secure in her social adjustment on a superficial level. Underlying emotional lability results in blocking and confusion in emotionally stimulating situations. She loses control and shows poor judgment. Instinctive impulses are only moderately repressed and a fairly strong sex drive is indicated.

Identifications have obviously been inadequate. Both aggressive strong and passive weak figures are associated with instinctive impulses. The content of her imagery—a gorilla, a bull, a wolf, flames—illustrates her instinctive and emotional vitality.

Subjects whose illness was brief and comparatively light show more instinctive vitality, better emotional adaptation or stronger obsessive-compulsive defenses than do those whose illness was brief but serious.

Observation of some of these patients who, since they were first seen, have qualified as chronic invalids confirms the positive prognostic value of these Rorschach signs of vitality and strong defense mechanisms.

HYPERTENSIVE CARDIOVASCULAR DISEASE

Patients with hypertensive cardiovascular disease also show strong passive dependence needs. However, they experience a much more acute conflict between this passivity and aggressive, self-assertive impulses, than do patients with rheumatic disease, a much more constant alternation between these opposing tendencies. "I don't know what these are, bears or mice," they will say, unable to choose between the strong and the weak figures. They show a much greater need to dominate, to achieve, and to be respected. They are more ambitious, more competitive, more concerned with self-development and with living their own lives. Consistent with these traits is their stronger introversive tendency—the greater emphasis upon inner values of creative thought and imagination, upon day-to-day pleasures. Accordingly, they are less responsive to the outer world, less emotionally dependent upon it, less labile and suggestible. They show greater self-confidence in dealing with outer reality and in emotional relationships with others, although they are fearful of expressing strong feelings and have high standards of emotional control. The drive to dominate appears to be an attempt to make up for inner insecurity and fear of possible weakness.

Obsessive-compulsive defenses are frequent among these patients. Depressive anxiety is also frequent in the forms characteristic of subjects with introversive tendencies—critical introspection, a sense of worthlessness and concern with failure in achievement.

There is more evidence of conscious hostility in these patients and more freedom in expressing hostility although the expression is usually indirect and rationalized. Hostility is expressed indirectly through a defensive manner even in taking the Rorschach test. They will say, for example, "I don't know what that looks like. . . . . What are they supposed to represent, animals or anything? To me it looks just like ink," or, "There's really nothing outstanding in these, at least I don't see it." Masochism is conspicuous, but it is not as persistent as among rheumatic patients, and sadistic tendencies are more prominent.

The continuous conflict experienced by these patients is described in the following Rorschach interpretation of a 24 year old man:

Case X-71-HA: This is a highly intelligent subject who is too afraid of authority and of his own aggressive impulses to apply his rich potentialities fully. He does not generalize

and abstract as courageously as he might; his interests, the flexibility of his associations, his originality are all more limited than is expected in a healthy individual of his intelligence.

His prevailing mode of experience is introversive; that is, he tends to day-dream, reflect, amuse or distress himself with his own fantasies, and to act out infantile instinctive drives more than he responds affectively to stimuli from the outside world. His emotional contact with others is slight. He is very well controlled, affable and not stiff, but he is not emotionally responsive, is much more self-absorbed than concerned with the other person, and he finds it difficult to express strong feelings. Beneath his surface control he feels violent aggressive impulses to which he is afraid to give any outlet except in sadistic fantasies. And even his fantasies are so disturbing because of the fear and guilt accompanying them that he retreats from them to an infantile kind of activity.

He seems to have had an unhappy childhood characterized by hostility toward his father and by frustrated sexual and dependence longings toward his mother. He is afraid to face completely his hostility toward his father because of his strong need for dependence and his fear of punishment. These problems are depicted in the following imagery: "a baby holding onto a dog, chased by a man with a beard." "Two hooded men representing Terror faced by a person you might call The Good . . . . (who) is preventing them from coming forward with their birds of prey." And later, "Two men squatting with their hands up, scraunchy old men . . . . very little head, no brains. . . . . Their legs seem to be cut off, shreds of 'em . . . . blood on it and shreds of flesh hanging down." He seems to have no desirable male imago with which to identify. Toward women he feels a combination of dependent idealism and infantile sadistic sexual impulses. Ambivalence is marked in his attitude toward everybody. With weak, small, helpless figures like the baby, he readily identifies; he does not feel ready to be an independent man in an adult world. He cannot make up his mind what kind of a person he is or wants to be; constant conflict with his superego makes him unsure of his values and a vacillator in all his pursuits.

The inability to find satisfactory, emotional self-expression and affective contact with those around him must produce great tension in a person with so much vitality.

The same general personality gestalt is found repeatedly in hypertensive patients with the same basic conflict varying according to the intelligence of the subject and the severity of his illness. Older subjects with limited education and intelligence and a long history of illness show more personality constriction, a general emotional impoverishment, with few adaptive defenses. Decrease in emotional spontaneity is accompanied by increased tension and increased hysterical tendencies, until the patient feels constantly like a pot about to boil over.

CORONARY OCCLUSION

The following report on a man, aged 46, admitted for a coronary occlusion, describes traits found to be distinctive for patients with coronary occlusion in contrast with the other cardiovascular groups.

Case 76-COA: Intelligence is high average. The subject is extremely ambitious, he generalizes compulsively, has good organizing ability. He is active and aggressive but productivity is inhibited by anxiety.

Inner creativity is extremely limited, the inner life being dominated by infantile instinctive drives. Strong hostile aggressive impulses associated particularly with sex arouse feelings of guilt and of inner tension as he attempts to repress them. Emotional responses to the outer world are limited and when given, are violent, uncontrolled, and diffuse. He lacks subtle adaptive responses, and sensitivity to nuances in his environment. Moods and feelings are not stable, however. He is highly reactive, displaying infantile aggressiveness, oral dependence, guilt, depression, and anxiety regarding his adjustment.

Although in our serial admissions the number of patients with coronary occlusion is small, they manifest a persistent pattern of aggressiveness and drive to dominate which distinguishes them from patients in the other groups. They are usually very ambitious and strive compulsively to achieve goals incorporating power and prestige. Limitation of the introversive experiences of creative thought and imaginative reflection increases their dependence upon achievements in the external world for satisfaction and security. They do not have the immediate, day-to-day values of inner living, which for patients with hypertensive cardiovascular disease are at once a source of independence and satisfaction and an interference with the aggressive pursuit of external long range goals.

Coronary patients are reactive and frequently quite extratensive, displaying a good deal of emotion outwardly. Although they try to keep their strong aggressive impulses under control, they manage to justify to themselves a good deal of outwardly expressed hostility.

When seen in the hospital after having suffered a coronary occlusion they are usually in a severe anxiety state which is only partly related to recent physical trauma. This anxiety is usually also related to feelings of inadequacy, failure, and guilt. The guilt may be associated both with their status in society and with specific sexual relationships. Frequently, these inadequacy feelings are not acknowledged but are projected onto the outer world producing an attitude of critical cynicism.

FRACTURES

Patients with fracture may be distinguished from patients in the cardiovascular illness groups although the fracture group shows the widest range of personality differences. The Rorschach test differentiates 3 subgroups of fracture patients, about equal in size. Among those with predominant tendency toward in-

troversive living, emotional responses are extremely limited. They have lively imaginations and strong instinctive drives combining infantile dependence needs with violent aggressive, often sadistic impulses. High standards of emotional adaptation to the outer world seem related to their fear and repression of spontaneous expressions of feeling. Guilt and depression are frequent in this group.

A second group is highly constricted in experience, repressing both inner spontaneity and emotional responses to others. They manifest considerable tension, compulsive traits, and an anxious insecurity with an underlying conflict between passive and self-assertive impulses.

These first two groups show the highest total incidence of accidents, the introversive group including most of the patients with 2 or more accidents.

The third group is predominantly extratensive with limited reflective and fantasy life and considerable emotional responsiveness to the outer world. The aggressive impulses find greater outlet through outward expression, but these patients are still far from free in expressing aggression because of fear and desire for adaptation.

Among the patients in all these groups appears an effort to compromise between adaptive submission and self-assertion while avoiding uncontrolled releases of aggression and hostility. There is seldom evidence of a drive to dominate or to achieve power and prestige, but rather a marked emphasis upon self-determination, independence, and day-to-day pleasures.

Consistent with these values is their decisiveness and their ability to give both intellectually and emotionally differentiated reactions. In the face of disturbing emotional stimulation there is frequent blocking rather than giving in to uncontrolled reactions. The blocking seldom lasts, however; the patient rescues himself either by repressing the emotional response completely or by expressing differentiated feelings with considerable intellectual control.

CONCLUDING REMARKS

According to the present evidence, the patient whose personality resembles that associated with a given illness is more likely to have organic damage the more he diverges from psychologically healthy norms and manifests a failure or lack of protective defense mechanisms. This evidence may seem at variance with the hypothesis that there is an inverse relationship between neurotic symptoms and organic pathology. If, however, the neurotic symptoms are conceived of as protective defense mechanisms, agreement is apparent. The Rorschach results show a very high incidence of neurotic personalities among hospital patients as compared with non-hospitalized populations. Neurotic conflict, insecurity, and inhibition are present in nearly all cases, but the more severe the organic damage, the more limited the compensatory psychological defenses.

There is no simple, single clue so far apparent by which a patient invariably reveals through the test that he has rheumatic fever, for example, or a damaged heart. Although each of the illness groups is characterized by a distinctive gestalt of personality traits, there is, nevertheless, within each group a wide range of personality differences. The self-portrait which each patient projects through his responses to the Rorschach plates is unique as is the individual himself. If the results for each group were compared by a technique of factor analysis, many patients would be found to have more factors in common with patients in other groups than they have with most patients suffering from the same illness syndrome. Each factor must be weighed and considered in interrelationship with all the others. A certain illness, or a propensity for it, may be deduced only from the Rorschach picture of the personality as a complex whole.

The Rorschach method has proved to be of value not only as a research technique in determining the distinctive personality constellations characteristic of various illness groups. It is also useful in differential diagnosis in indicating cases where there may be overlapping syndromes and in cases with emotional problems that may require special attention. Finally, the Rorschach interpretation of a personality may be used constructively in outlining a therapeutic program.

SUMMARY

Rorschach study of hospital patients with rheumatic disease, hypertensive cardiovascular disease, coronary occlusion, and fracture show that certain distinctive personalities are associated with each illness syndrome. Patients with rheumatic disease are characteristically passive, masochistic, instinctively weak and infantile, with an underlying hysteria. Hypertensive patients are more ambitious for power; they have more conscious hostility and experience a more constant, acute conflict between aggression and their dominant passive, dependence needs. They are more introversive, less labile and hysterical. Obsessive-compulsive defenses are conspicuous in hypertensive patients, and particularly obsessive doubts.

Patients with coronary occlusion show a distinctive pattern of aggressiveness and compulsive striving for power and prestige. Introversive experience of creative thought is undeveloped, making them more de-

pendent upon external achievement for satisfaction and security. They are reactive and express considerable hostility.

Fracture patients are divided into 3 groups: the introversive, constricted, and extratensive; the first two groups showing the highest incidence of accidents. Among all groups is an effort to compromise between passivity and aggression, with a marked emphasis on adaptation, self-determination, independence of authority, and day-to-day pleasures.

Personality constriction increases with organic damage. Neurotic conflict is evident in nearly all hospital cases, but the more limited the psychological defense mechanisms, the greater the likelihood of serious physical illness.

The Rorschach method yields no simple pathognomonic signs; a certain illness or propensity for it may be deduced only from the Rorschach picture of the personality as a complex whole. The method has proved its value not only for research, but also for differential diagnosis and for outlining a therapeutic program.

NOTE

The Council of the American Society for Research in Psychosomatic Problems has unanimously voted to postpone the annual meeting of the Society, which was to have been held in New York in June, 1945. This action has been taken in compliance with the request of the Office of Defense Transportation that conventions be cancelled.

THE ROLE OF THE AUTONOMIC NERVOUS SYSTEM IN CUTANEOUS DISORDERS *

STEPHEN ROTHMAN, M.D.†

First I will attempt to describe briefly the autonomic impulses reaching the skin; subsequently I will try to analyze their clinical significance.

Fear, anger and rage cause constriction of the pilomotor muscles. This effect of emotion, more spectacular in cats and dogs than in men, has a subcortical center in the hypothalamus (30). The impulse descends through the brain stem and the medulla, and leaves the spinal cord in the anterior roots. It reaches the periphery via sympathetic pathways. The pilomotor reaction is usually associated with a vasoconstrictor impulse causing paling of the skin in spots around the erected follicles and hairs. Both impulses are conveyed to the skin by sympathetic fibers, and physiologically both are adrenergic impulses. As a result of nerve stimulation epinephrine or a related substance, sympathin, is liberated at the sympathetic nerve endings, and this substance acts on the effector organs, in this case on the pilomotor muscles and the muscles of the minute cutaneous vessels. The fleeting pilomotor impulse, as it occurs under emotional influence, corresponds with the effect of epinephrine in 1:1 billion concentration if applied intradermally in the cat (7). There is some evidence (7) that an intensive pilomotor stimulus liberates an excess of sympathin causing pale spots to appear even if vasoconstrictors are not stimulated.

The third kind of autonomic nerve impulse to the skin is that carried by the secretory fibers of the sweat glands. The anatomic pathway is sympathetic and identical with that of pilomotor and vasoconstrictor impulses. Physiologically and pharmacologically, however, the sweat fibers behave like parasympathetic or cholinergic fibers. The liberation of acetylcholine in the skin following stimulation of sweat fibers was demonstrated by Dale and Feldberg in 1934 (8). Correspondingly, the impulse is abolished by atropinization and enhanced by physostigmine which blocks the acetylcholine splitting esterase and therefore accentuates the effects of acetylcholine. Sweat secretion is probably the finest recorder of minimal emotions and of minimal mental effort. Endeavoring to solve a simple puzzle or a simple mathematical problem, anyone of us will measurably increase his sweat secretion. The psychogalvanic reflex and the first lie detector models are based on this impulse; but it has proved to be rather too sensitive for lie detection. Emotional sweating is most pronounced on palms and soles, but it is demonstrable over the whole skin surface.

The fourth type of autonomic impulse which produces vasodilatation in the cutaneous arterioles is the most important and most controversial. In 1901 Bayliss (3) demonstrated that if the posterior roots of the spinal cord are sectioned and the peripheral stump is stimulated vasodilatation occurs in the corresponding skin area. At that time it was taken for granted that the posterior roots carry only afferent impulses, and therefore the efferent vasodilator impulse was regarded as "antidromic." Lately, several data were presented (5, 2, 18) indicating that sensory fibers and vasodilator fibers, although running together, are not identical. Also, evidence is accumulating that the antidromic vasodilatation is a cholinergic impulse (32, 23). It is not abolished by atropine as are all the other peripheral parasympathetic cholinergic impulses. But this may be explained by the assumption that vasodilatation is due to the nicotinic and not to the muscarinic action of acetylcholine.

These two different pharmacological actions of acetylcholine are best understood by the example of how they influence the blood pressure. If the blood pressure of a cat is recorded continuously and a small amount of acetylcholine is given intravenously, the curve shows an initial great fall and subsequently a slight rise. After that, if the animal is given atropine and then the same amount of acetylcholine injected again as before, there is no fall in blood pressure, the fall being due to muscarinic action and being abolished by atropine; the rise which is due to the nicotinic action will remain. A large dose of acetylcholine paralyzes the nicotinic action of a subsequent small dose in the same way as large doses of nicotine paralyze the effect of subsequent small doses of nicotine.

Although many physiologists still doubt that antidromic vasodilatation occurs physiologically, it is compatible with all experimental and clinical data to assume that this impulse has its cortical and subcortical (hypothalamic) connection (11), that it has a lower center in the floor of the fourth ventricle (21), that it leaves the spinal cord through the posterior roots, and that the pathway of the emotional blushing is just that.

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The peripheral neurons of the antidromic vasodilators, pilomotor and sweat fibers form widely ramified axon systems in the skin. When the nerve endings are stimulated at a small point a widespread area responds, the impulse first ascending to the highest point of ramification and then descending all over the rami. These axon reflexes have a high degree of autonomy, they can be elicited after their connections with the central nervous system have been severed, as long as the nerve fiber does not degenerate. The sweating and pilomotor axon reflex also was demonstrated in freshly excised skin (22). An antidromic vasodilator reflex forms the red flare around urticarial wheals and around the site of skin injuries in general. We have shown that this impulse leads to the liberation of acetylcholine (23).

Little is known about the fifth kind of autonomic innervation, namely that of the sebaceous glands. During the great influenza epidemics in 1918 a so-called "ointment-face" was observed in patients suffering from infectious encephalitis and post-encephalitic parkinsonism. This "ointment face" is the manifestation of a tremendous increase of oily secretion by the sebaceous glands, a hypersecretion which is by no means restricted to the face as suggested by the name, but involves the whole body surface (25). This excessive seborrhea is always associated with destructive processes in the midbrain or in the pons. Stiefler (26) developed the theory that the destructive process acts by abolishing a center of inhibition for sebaceous secretion. The validity of this theory was substantiated by Perutz and Lustig (20), who have demonstrated the greatly increased activity of sebaceous glands after destruction of the midbrain in rabbits. The oleic seborrhea in adolescence, a phenomenon so common that it almost can be regarded as physiological, depends upon the presence of androgenic hormones in the blood stream. But it has not yet been investigated whether this effect is a direct chemical-hormonal action on the sebaceous glands or whether the action is indirect, mediated through the midbrain.

Omitting the sebaceous gland innervation in the further discussion, we may state that among the four other impulses the andrenergic pilomotion and vasoconstriction are often associated with each other in response to emotional stimuli and so are the cholinergic sweating and the vasodilatation. But this grouping is by far not constant. It suffices to mention the example of "cold sweat" which represents the association of vasoconstriction and sweating to show that it would be an oversimplification to classify emotional stimuli as either adrenergic or cholinergic. The type of emotion will by no means specify the impulse. Emotions so widely different as are rage and fear are equally likely to cause pilomotion. Blushing, though paradigmatically an expression of bashfulness or shame, is observed in anger as well. Some persons turn pale when they get mad, and others redden. There are persons who at one occasion react with a red face, and at another with paling to the very same emotion. There are no andrenergic or cholinergic, sympathetic or parasympathetic individuals or personalities. It is a general rule that vasoconstrictors have a lower threshold and respond more rapidly than do the dilators. As a matter of fact often both vasoconstrictors and dilators are innervated simultaneously with the dilators usually prevailing. Langworthy (14) pointed out that "the antagonism of function in organs which are innervated by both sympathetic and parasympathetic fibers has been exaggerated in the literature . . . . the functions of the two groups of nerves are correlated, and not antagonistic."

The individual differences in quality and intensity of the autonomic responses to emotions have their seat more often in the peripheral neuron and in the effector organs rather than in the center. A person who blushes easily responds also with increased local vasodilatation to heat stimuli, and bashfulness is not necessarily the main feature of his personality. A person who experiences goose flesh when listening to a gruesome story responds more readily with pilomotion to cold than others do.

Such increased peripheral responsiveness should become demonstrable by cutaneous pharmacodynamic tests, and one should be able to analyze whether the effector organ or the peripheral neuron is responsible for the increased responsiveness. Epinephrine and acetylcholine act directly on the effector organs, *i.e.*, smooth muscles and gland cells. We do not obtain any information on nervous excitability from tests with these two drugs. For testing of the responsiveness of the peripheral antidromic vasodilator fibers the histamine puncture as recommended by T. Lewis (16) is practicable. For testing of sweat and pilomotor fibers the intradermal injection of nicotine is recommended (22). Nicotine elicits a widespread axon reflex in the nerve fibers of these two systems.

Unfortunately, these tests never have been worked out with quantitative gradation for the purpose of clinical comparative testing. I do not know whether they ever will be practicable for the demonstration of fine differences. Anything which has been done up to the present time about pharmacologic testing of cutaneous autonomous functions, about so-called balance and disbalance, prevailing sympathetic or parasympathetic tonus etc. is entirely without value. First, no differentiation has been made between drugs acting on effector organs and on nerve fibers, and second,

in the recommended tests extremely high concentrations are used which cause an unnatural, long lasting spasm of the smooth muscles. Epinephrine, for instance, when applied intradermally in the concentration 1:1000, as recommended by many authors, will be present in a one million fold higher concentration than the physiologically liberated sympathin. The same is true for tests with acetylcholine and other choline esters. One author (9) recommends mecholyl in 2.5 per cent concentration whereas we know that the threshold concentration for eliciting sweating is 1:50,000,000 acetylcholine, and the optimal concentration for eliciting axon reflexes is around 1:50,000 (22). Another author (1) uses iontophoresis of a 5 per cent acetylcholine solution and observes sweating as a test for parasympathetic tonus. As a matter of fact such concentration will paralyze all the sweat fibers and will not give any information on any kind of tonus.

A fine clinical testing of individual differences in autonomic balance was lately worked out by M. A. Wenger (31). From the point of view of cutaneous reactions, however, we have to object that he uses red dermographism as an autonomic nervous reaction. The phenomenon of red dermographism is a local response of the contractile elements of small vessels and can be elicited in completely denervated areas with the same intensity as in normal innervated skin.

An interesting problem is the voluntary influence on producing and suppressing of autonomic impulses. In classical physiology autonomic impulses are defined as involuntary ones. However, many individuals are able to influence volitionally autonomic innervations either purely mentally or with the help of some kind of peripheral stimulation. One of my experimental subjects was able to produce a strong pilar erection all over his body by pulling a cloth through his clenched teeth. But he had to concentrate his attention when doing so, and the experiment failed when his attention was diverted. An extreme case of volitional pilomotion was reported by Lindsley and Sassanfan in 1938 (19). Their patient was able to erect the hair and produce goose flesh over the whole skin surface at will. When asked to do so he produced pilomotion within a second and maximum elevation of the hair was attained in about 7 seconds. He also was able to stop the impulse voluntarily within 6 to 7 seconds after the signal was given. More than that, he was able to suppress the physiologic pilomotion which was induced by stepping out of a hot shower into a cold draft. The voluntary pilomotor impulse was accompanied by a generalized sympathetic discharge including increase in heart rate, increase in the rate and depth of respiration, dilatation of the pupils and increased sweat secretion. Brain potential records indicated that the impulse arises in the premotor area of the cortex. This case is analogous to a few other cases in which voluntary control of accommodation of the eyes was observed. Also it is analogous to a case which I saw as a student in anatomy, a man who at will could increase and decrease the heart rate, move the heart closer to the chest wall and change the position of the apex impulse.

It is quite obvious that the so-called integrating centers in the hypothalamus are under a higher control in the cortex. Whether volitional suppression of the emotional autonomic impulses is possible is a clinically important problem. From clinical experience I would like to conclude that there are a great many persons who are able to train or to educate themselves towards such inhibition. The best example is emotional hyperhidrosis. This disease is occasionally so severe as to interfere with the occupational activities of the patient. Take the violinist virtuoso whose stage fever manifests itself exclusively in sweating of the hands and fingers. The idea that his moist fingers will slide on the strings at public appearances makes him sweat more. A similar vicious circle may be encountered in persons who blush readily and do so intensely when they try hard to avoid it. Functional hyperhidrosis with all its somatic sequelae such as maceration, creation of a susceptible soil for infection, I understand, is a serious annoyance in the Army today. Left alone, such psychosomatic disturbances may grow into intolerable conditions. However, most of them are amenable to rather simple therapeutic procedures. I saw surprisingly good results from simple reassurance and persuasion, from the insight of the patient into the nature of his illness. Barbiturates as contrasted with all other types of hypnotics and sedatives have a remarkable effect on all emotional autonomic impulses acting depressively on the hypothalamus (28) where the efferent impulse is integrated. The underlying neurosis of blushing and sweating seems not to be all too serious, and I believe the number of cases which need expert psychiatric treatment is relatively small.

A remarkable pathologic exaggeration of blushing is the emotional urticaria, also called cholinergic urticaria (10, 12). This is the only disease the psychosomatic mechanism of which is relatively well understood. Patients suffering from this disease are, overwhelmingly, young females who break out with generalized urticaria when they get excited, for instance before going to a dance, when being scolded by their mother etc. They respond with urticaria to external application of heat as well as to emotional stimuli because they are allergic to acetylcholine which is released in the skin in response to either emotional or heat stimuli.

To local application of acetylcholine these patients display a local triple response, as if they had obtained histamine, and they break out with generalized urticaria on systemic administration of acetylcholine. When heat is applied locally, the released acetylcholine reaches the central nervous system with the blood stream and elicits there a widespread nervous impulse leading again to release of acetylcholine at the nerve endings causing generalized urticaria. This disease represents one of the rare cases of allergy to a physiological metabolic product. The disturbance in these people is not that they are exceedingly emotional, their nerve endings do not release more acetylcholine than normal or do not release it more readily but that the response of their skin to liberation of acetylcholine is pathologically increased. Acetylcholine not only causes the physiologic arteriolar dilatation but also a temporary increase in the permeability of minute vessels which leads to wheal formation. The vascular damage is repaired in a few hours. The individual urticarial wheal does not persist longer than 3 to 4 hours.

I have treated emotional urticaria in three cases with gradually increasing doses of acetylcholine intradermally with the idea that possibly a desensitization can be achieved. Two out of the three patients lost their emotional and heat urticaria within three months together with a disappearance of urticarial response to acetylcholine, whereas the third patient remained unchanged.

It must be emphasized that the emotional vasomotor impulses to the skin are always of short duration, and therefore they do not interfere with the nutrition of the tissues to such a degree as to cause permanent injury in the vessel wall or in other tissue elements. The effects can be artificially prolonged and accentuated by external stimuli, particularly vasoconstriction by cold and vasodilatation by warmth, but still permanent damage will not result. In the vasoneurosis called "dead finger" the vasoconstrictor paroxysm may start with an emotional impulse or this may act in combination with cold—from such an attack gangrene never results. Therefore it is important to differentiate the functional vasoneurosis from Raynaud's disease; the latter always involves an organic fault in the arterial vessel wall (17). In erythralgia attacks of painful redness may be elicited by emotional vasodilator impulses but it never will arise without an organic nerve injury (18).

These considerations lead to the more general statement that as far as the skin is concerned, emotional vasomotor and other autonomic impulses in themselves are not capable of producing necrotic processes and permanent inflammatory bullous and vesicular reactions. Kreibich (13), who thought he produced hemorrhagic bullae by hypnotic and similar procedures did not protect himself sufficiently against the inventive fraudulence of hysterical persons. It still remains to be proved that emotion in itself is able to cause blister formation and necrosis.

On the other hand, though the autonomic impulses are short-lasting, they may very well interfere with the course of a disease which is present independently from emotions, such as an infectious disease, or a disease of metabolic or allergic origin. Emotional elements in such conditions were neglected in the past, but lately more attention has been paid to them, particularly on the basis of the work of Becker (4) and of Stokes (27). It seems that among all impulses the antidromic vasodilatation is the most important one because the resulting arteriolar hyperemia increases all inflammatory signs and decreases the itching threshold (24). A patient suffering from an itching skin disease will be the subject of more intense itching when troubled by the emotions of distress, self-pity, uneasiness, and apprehension. Again, phenobarbital is the best drug to counteract this complicating mechanism. Atropine is ineffective because it does not abolish the antidromic vasodilatation which is nicotinic in nature. Gastroenterologists are more fortunate in this respect because in functional bowel distress they have to deal exclusively with the muscarinic action of acetylcholine which can be checked by small amounts of belladonna.

A completely mysterious psychic effect is that on virus diseases. Excitement may provoke the outbreak of herpes simplex repeatedly in the same area and usually following the same type of excitement (29). Recurring herpes simplex in general must be interpreted by the assumption that the patient is a steady carrier of the herpes virus; different factors activate the otherwise dormant virus from time to time. Such factors are infectious diseases, common cold, pneumonia, meningitis, furthermore menstruation, sunlight, etc. It seems that emotion may have the same trigger effect. Even less understood is the action of psychic stimuli on common warts. B. Bloch in 1927 (6) proved that the cure of verruca vulgaris by suggestion is a reality. Thus the superstitious procedures against warts known since the Middle Ages would have deserved more credit than a scientist would have thought they do. Bloch obtained 88.4 per cent complete cures in a large material by pure suggestion. Suggestive therapy of warts now is done routinely in the dermatologic offices. Speculating on the mechanism I thought that the answer here again possibly is the chemical mediation of nerve impulses; that the virus is damaged by either epinephrine or by acetylcholine or by both or by some unknown mediator. Experiments were car-

ried out in our department with injections of acetylcholine into the base of common warts, but our results up to now have not been encouraging. Some virus diseases have a remarkable tendency to spontaneous healing. This tendency is as little understood as is the psychic influence on it.

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Discussion

Commander Marion B. Sulzberger (New York, N. Y.): After hearing Dr. Romano's masterly discussion this morning I was in doubt only as to the particular style of syncope I would have when I came here to the stand before you—whether it would be the vasomotor type or the conversion type of syncope. In other words I have been both chronically and acutely conscious that this is a subject which I am not fully competent to discuss.

For this reason I must ask permission to digress a bit from the main theme of the vasomotor autonomic nervous system and its effects on the skin. I would like permission just to relate some of my own experiences, which may have closer or more remote bearing on the problems which have been touched upon in Dr. Rothman's excellent presentation.

I believe I knew the patient referred to by Dr. Rothman. I think it was Lesser's patient or, if not, a man very similar to him, who was presented to us in the 1920s when I was a medical student in Zürich. This man apparently had learned several tricks besides the one of producing voluntary sweating in different parts of his body. For instance, he could produce pilomotor responses ("goose pimples") al-

most anywhere at will. He could accelerate and depress his heart rate at will. He could shift his heart in its position in the thoracic cage, could shift his mediastinum voluntarily, and at anytime. He could dilate and contract his pupils, and a few other tricks of that kind. He could simultaneously cry on one side of his face and smile on the other side.

I think I was interested in this patient principally because I was already an embryo dermatologist and he presented one of the largest x-ray ulcers that I have ever seen. His entire back was occupied by an x-ray burn, with carcinomatous and ulcerative changes. This ulcer was due to the almost constant year-long use of the fluoroscope in demonstrating to medical students the shifting of his mediastinum and of his heart. These demonstrations were the patient's means of earning his living.

But it appears that I was already interested not only in the dermatologic picture but also in the relations between the psyche and the cutaneous soma. For I recall that I was the only one of the students who went up to the patient after the demonstration and asked him how he brought about these things, whether he was conscious of what he did in order to create the pilomotor responses, the sweating, the crying, and so forth. He said, yes, he knew quite well what he did. He had to visualize, for instance, plunging into cold water, or plunging a part into cold water, in order to create the pilomotor response of that part. And he had to think of heat being applied to a certain part of the body in order to produce sweating of that part. But he could not explain to me what he did when he shifted the mediastinum. So that was perhaps my first medical experience with psychosomatic relationships.

But I think that my interest in this subject is due principally to the fact that the skin is one of the best test organs, the largest and most accessible effector organ for the study of psychosomatic mechanisms.

You all realize better than I do how often, in any discussion of psychosomatic mechanisms, the reactions of the skin are mentioned; for instance, those reactions which I have listed, pilomotor responses, sweating, blushing, constriction and dilatation of the skin vessels. In addition to these there is almost constant reference to the changes of skin temperature and the changes in the levels of sensitivity of the sensory apparatus of the skin. One can say without exaggeration that in the study of the effects of psyche and emotions as well as the pharmacodynamic effects of drugs, the surface has just been scratched, and that the skin and its responses offer a tremendous field for further accurate investigation.

As I have said I do not claim to be conversant with this subject and its literature, and I shall therefore confine myself to stating what I have seen and what I have not seen. To sum up the negative side, I have never seen a full-blown, typical skin disease, an entity in the strictest sense of the word, with more or less permanent cutaneous changes, directly produced by purely psychic and emotional factors alone.

In twenty years of observation and looking for such a case, I have seen only what I would describe as quantitative effects. In other words, I have seen only exacerbations of existing states take place under the emotional impulses and excitations coming from the cortex. I have seen the physiologic or pathologic mechanisms only increased or decreased and the physiologic or pathologic signs and symptoms only increased or decreased.

I don't need to mention sweating, blushing and pallor as physiologic changes which can be brought about by psychic influence. Those are obvious ones. But I think it is important to mention that itching is probably physiologic and that it too can be increased or decreased by purely psychic factors.

Perhaps the most important consideration in the whole field of psychosomatic dermatology is the clear realization of how psychic and emotional mechanisms can first elicit quantitative and physiologic changes in the functions of the skin and how these can in turn act as "triggers" which irritate and alter skin eruptions. A common example of such a chain of events is the psychic, emotional and vasomotor mechanisms which lead to increased sweating—which in turn lead to increased maceration—which both in turn favor increased growth of pathogenic fungi—which in turn leads to active manifest eruptions of fungous disease.

Before the war, before I was in military service, examples of this type of exacerbation of fungous infections of the feet and of the hands (almost always secondary eruptions of the hands) were most clearly seen in people who were subjected to periodic recurrent emotional stresses. In such patients I could repeatedly check back and see whether there was a coincidence of emotional stress, increased sweating and exacerbation of their fungous infection.

For instance I could sometimes tell how many shares had been traded in on the stock exchange, because the day after a day of several millions of shares, a number of my stock-broker patients would regularly appear with an exacerbation of their fungous eruptions of feet and hands or groins. One could actually plot a rough sort of curve, correlating those two things, the number of shares sold and the activity of fungous eruptions appearing among brokers.

In military medicine it is, of course, tremendously important to realize how many cases of hyperhidrosis become incapacitated because these men cannot march on macerated feet; and just what part their anxiety and tension and the disagreeable aspects of their military duties, and their fears and their obligations and the stress of their obligations, contribute to the production of fungous infections in military personnel. And of course in many theatres of operations these emotional and psychic factors are added to conditions of constant sweat, external moisture, and swamps, with no opportunity for ordinary hygiene, for drying or change of footgear or clothing. So it was easy for dermatologists to foresee that skin diseases would constitute one of the major problems of military medicine. And, indeed, it has become quite apparent to all that fungous infections of the skin are one of the great causes of ineffectiveness in both the Army and the Navy. In some theatres of this war over 75% of all cases reporting sick are affected by skin diseases. There is no doubt, in my mind, that this high incidence is in some ways connected with both the external and local somatic conditions and with the emotional stresses.

Itching is another important physiologic reaction which can be initiated and decisively influenced by the psyche. I

need not stress that itching leads to scratching and that the secondary skin changes which can appear after scratching are manifold. The obvious secondary changes are, of course, the excoriations and the infections and the various responses to constant rubbing and pressure, which can bring about everything from calluses, lichenification and hemorrhages to real eczematization, depending upon the type of itching and the type of traumatic and frictional measures which are used by the patient to relieve it. It is, perhaps, not sufficiently well known that latent skin diseases, such as psoriasis and lichen planus, and a group of other skin diseases, will sometimes appear or localize in areas which are scratched or otherwise traumatized.

For instance, by simple methods such as just taking a pin and producing very superficial non-bleeding scratches, one can draw one's name on a patient's skin. Or if one is not egocentric enough to scratch one's own initials on the skin, a heart with an arrow through it or any other design will do. And in many psoriatic or lichen planus patients the design will appear as typical psoriasis or lichen planus papules approximately two weeks later. So that very often, under psychic and emotional strains, a number of classic skin diseases can appear in certain sites—not *primarily* because of the effects of the psyche or emotions or the autonomic nervous system—but *secondarily,* via the increased itching and scratching which lead to the trauma which results in the localization or even the first appearance of the skin disease.

Dr. Rothman gave many interesting, and pertinent examples of skin changes secondary to psychic effects. Herpes simplex is perhaps one of the most convincing of all these examples. For it can be readily demonstrated that the primary and the direct cause of all herpes simplex eruptions is the herpes simplex virus. One can culture that virus or use the rabbit's cornea to demonstrate its presence in the fluid of the vesicles just as well in a case of herpes simplex which follows an emotional upset as one can in a case of herpes simplex following a cold, or fever or sunburn or other cause.

I have seen all the happenings I refer to over and over again. And the same applies to the mysterious disappearances of warts upon suggestion and following psychic influences. These are all things which I have seen myself and to which I can testify. But I must stress once more that I have never seen irreversible, non-physiologic, primary, more or less permanent manifestations of skin disease produced directly by psychic influences. Whenever I have seen a skin disease connected with psychic and emotional changes there was always an intervening, *intermediate mechanism* which was the direct cause of the skin lesions.

I am certain that psychiatrists will find considerable to criticise in what I have said; and as a dermatologist I often have considerable criticism of what I hear presented in groups dealing with psychosomatic medicine. For example, I often feel there may have been a tendency to somewhat neglect some of the possible somatic links of the causal chain.

For example, in the cases presented by Dr. Rosenbaum this morning, I would like very much to know more about the young lady who, while on the train and after she had the emotional upset because her engagement had been broken, began to have itching and eruption of the feet. I would like to know, for example, if she did not have on a new pair of shoes or stockings bought for the wedding journey; and whether or not she was hypersensitive to the leather or dyes of rayon or nylon or finishes of the foot gear (all not uncommon forms of allergy).

And in Dr. Rosenbaum's second case, in which there was pruritus vulvae beginning about forty-eight hours after the application of a mercurial ointment, I certainly would like to ascertain whether there was or was not a hypersensitivity to mercury (a not uncommon form of allergy). In other words, this field is full of pitfalls unless one carries out all possible investigations of "somatic factors" as well as all studies of the psychic and emotional influences. And this combined exhaustive investigation is a tall order indeed and one that can be filled but rarely—it requires patient careful collaboration by groups of specialized experts.

In closing I would like to tell you one story illustrating possible pitfalls.

A young woman was referred to our office because of hives. The referring physician was a very capable psychiatrist and psychoanalyst, and a good friend of mine. The patient was about twenty-seven or twenty-eight years old, intelligent and of pleasing appearance and personality. She gave the following clear, lucid and connected story: She did not know why my friend the psychiatrist and psychoanalyst had referred her to a dermatologist. She had told him that her hives and itching eruptions were clearly due to psychic mechanisms and emotional disturbances. She was absolutely certain of their emotional causation because the eruptions inevitably occurred in the following way:

She had a lover with whom she had been going for many years. She never had had an attack of this itching eruption or hives as long as she was on good terms with this young man. But the moment they had a real, serious falling-out and the moment their paths went asunder, she immediately—always within the first twenty-four hours of that dispute and separation—began to have an itching eruption.

Moreover this itching eruption invariably persisted until they had made up; and always ceased and disappeared within about twenty-four hours of the happy re-union with her lover.

On careful checking there was no doubt as to the truth and accuracy of the patient's story. The history went back for years, and these coincidences, these chronological sequences were, I am sure both regular and correct. We then proceeded to examine the patient—and at the very first glance it was apparent that her eruption was a typical widespread and quite severe case of *bedbug bites.*

This young lady had bedbugs infesting her own bed and apartment—a bed and apartment in which she had slept only during those periods when she was at odds with her lover. This is a true record of a recent case; and this case is only one of the many I could cite to emphasize the great care we must all exercise in our attempts to evaluate the relative roles of psychic and of physico-chemical factors in the production of cutaneous changes.

AN EXPERIMENTAL STUDY OF THE FUNCTIONS OF THE FRONTAL LOBES IN MAN*

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Many recent experimenters[1] have attempted to describe the personality and behavioral changes in man produced by frontal lobe lesions, and to postulate some theoretical constructs to explain them. With the advances in neurosurgery which allow a better determination of the location and extent of the lesion than was possible a number of years ago, and with the introduction of experimental techniques in place of gross clinical observations, one would expect that general agreement between the results of different experimenters would be present. Such is not the case, however.

In the first place there is disagreement as to whether any behavioral or personality changes are produced by frontal lobe lesions. Dandy (3), Hobb (21, 22), Hebb and Penfield (23), Jefferson (26), Lidz (30), Penfield and Evans (33), and Rowe (35) have been impressed by the absence of any changes in individuals with lesions of the frontal lobes. On certain activities, however, Ackerly (1), Brickner (2), Gelb and Goldstein (7), Goldstein (8, 9, 12), Goldstein and Scheerer (13), Halstead (14), Harrower-Erickson (17, 18), Hyland and Botterell (24), Nadel (32), Rylander (37), Sachs (38), and Strauss and Keschner (40) have found modifications in the behavior and personality of such patients. That these contradictory results are found not only in experiments on individuals with unilateral lesions of the frontal lobes but also in patients with bilateral lesions is shown in the works of Brickner (2) and Hebb and Penfield (23). The latter investigators were unable to detect the marked effects on the behavior of a patient with approximately two-thirds of each frontal lobe removed which were observed by Brickner in a patient with bilateral lesions, and concluded that the removal of this amount of the brain uncomplicated by pathological changes of the rest of the brain need give no grossly deteriorating effects. As nearly as is possible with these contradictory results, the effects of frontal lobe lesions in man can be summarized as follows: (1) There is general agreement between the different experimenters that on certain specific tests the responses of individuals with frontal lobe lesions are grossly altered. This appears to be true on tests which require the separation of a large number of different objects into classes of color, use, size, shape, etc. (7, 9, 13, 14, 32, 42), on the Rorschach test (17, 18, 32, 34), and on figures with reversible perspectives (10, 16, 42). The number of tests on which such agreement exists, however, is not very numerous.

(2) As far as can be determined by standardized intelligence and performance tests in use in clinical diagnoses, there is no impairment of ability following frontal lobectomies (1, 21, 22, 30).

(3) Some alterations of emotional responses have been reported in patients with frontal lobe lesions, although such changes are seldom very pronounced and do not seem to follow any specific pattern in the sense that the patients have been reported to display euphoria, depression, and other contradictory symptoms (12, 17, 18, 37, 38, 40).

(4) Although aphasic symptoms are reported to be present with some degree of consistency in patients with lesions in the dominant hemisphere, there is good reason to believe that aphasia in the pure form of the classical conception is seldom present if refined methods of examination are used. Such symptoms may be largely an indication that certain functions which underlie a great deal of the individual's behavior, rather than those pertaining to the speech alone, are affected (8, 20, 19). Of interest is the fact that the attempt made by Head (20) to standardize tests for aphasia has not been found successful for this purpose as has been shown in the studies of Weisenburg and McBride (43).

In the second place, the lack of agreement as to the behavior and personality changes which are produced by frontal lobe lesions is reflected in the hypotheses which have been advanced to explain the modifications which have been observed. Goldstein (9, 12) believes that individuals with frontal lobe lesions are unable to assume an abstract attitude in the solution of problems. Head (20) has introduced a number of concepts to explain the symptoms of aphasia observed in the patients studied by him, but postulates that a generalized function is affected which he calls vigilance. Brickner (2) postulated the concept of synthesis as the behavior primarily affected, and he consid-

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† Read at the American Neurological Association meetings, 1942. A discussion of the paper by Dr. Adolf Meyer and Dr. M. R. Harrower-Erickson has been published (46).

[1] For a review of earlier studies on the functions of the frontal lobes which are not mentioned in this paper, the reader is referred to Donath's (4) article.

ers that various other accompanying symptoms are due primarily to the decreased synthesizing capacity. Freeman and Watts (5) maintain that the frontal lobes deal with foresight, and state, "They assemble the available data, synthesize them, plan a course of action with the ideal in mind, and equipped with energy of response and with appropriate affective tone, project the individual into the future, direct him toward his goal and criticize his shortcomings" (p. 538). Halstead (14) in orienting his research problems on the functions of the frontal lobes has made use of the concept of equivalence advanced by Klüver (27). Of all of the concepts which have been advanced, the impression is formed that many of the authors are attempting to say similar things, but as Freeman and Watts (5) point out, there is a great deal of ambiguity in the exact meanings of the terms which are used.

The contradictions in the field of frontal lobe functions made it seem advisable to test our patients by using all the experimental methods which were available to us without any theoretical bias in their selection. Answers to the two following questions were sought: (1) On what tests do patients with unilateral lesions of the frontal lobes differ from normal controls? (2) If such differences exist, what hypotheses are most acceptable to explain them? Because of the large number of experimental methods with which patients were tested, it was physically impossible to test all of the subjects with them. For that reason, at times we tested no more than two patients with a certain method before discarding it, provided that the results did not differ from those of the controls. We do not know whether a statistical difference between the patients with cerebral lesions and the controls would not have been present if a large number of cases had been used. We can safely say, however, that the differences which did appear were so dramatic that they could be detected by using only a few patients. It was also impossible to test all the patients with the methods which differentiated them from the controls, since many of the patients were no longer available when the new methods were introduced. Many of the patients, however, were retested a number of times at different intervals, so that there was no question but that the scores represent their true performance.

SUBJECTS

Five patients, one with a left and four with right cerebral lesions of the frontal lobe were used in this study. Figure 1 shows the location of the lesions, the weight of the extirpated tissue and the kind of tumor.

Patient 1: An American-born male, age 36, a cost accountant for a large corporation, was operated upon Jan. 15, 1941. Approximately the anterior two-thirds of the anterior lobe on the right side was removed. Much of it was cystic so that the weight was 51.1 grams. The recovery was uneventful and the patient went back to work three months after the operation. His post-operative Wechsler-Bellevue I.Q. was 116. He was predominantly right-handed.

Patient 2: An American-born farmer, age 44 years, was operated upon Sept. 30, 1941. The entire tip of the frontal lobe on the right side was removed so that the optic nerve and chiasm were visible. The tissue was also removed medially to the falx. The olfactory bulb was completely removed, and the right anterior cerebral artery ligated. The extirpated tissue weighed 71.5 grams. The recovery was uneventful. His Wechsler-Bellevue I.Q. was 92. The patient was predominantly right-handed.

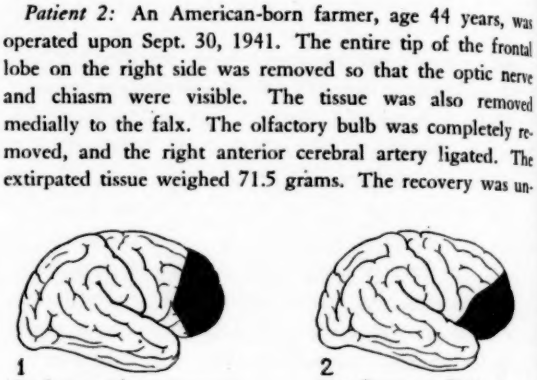

FIG. 1. Diagrams showing the areas of the tissue extirpated surgically of the five patients used in the study. The weight of the extirpated tissue and the kinds of tumor are also given.

Patient 3: An American-born retail coal dealer, age 45 years, was operated upon Nov. 4, 1941. The cortex on the right side was removed from the frontal pole to the midline and to the anterior end of the sylvian fissure. A large portion, 114.4 grams, of the tissue was removed, leaving a large cavity below. Some normal cortex was left, although the anterior fossa of the skull was quite clean. The patient's post-operative Wechsler-Bellevue I.Q. was 90 and his recovery was uneventful. He was predominantly right-handed.

Patient 4: An American-born housewife, age 23 years, was operated upon Feb. 5, 1941. The cortex on the right side from the frontal pole to the falx in its anterior one-half was removed, but in the posterior half next to the falx a thin

strip of cerebral tissue was left. The floor of the right anterior cranial fossa was entirely denuded of all brain and tumor tissue. The weight of the tissue which was removed was 106 grams. Following the operation there was some inability to hold objects in the left hand. Her post-operative Wechsler-Bellevue I.Q. was 76. The patient was predominantly right-handed.

Patient 5: An American-borne male, age 51 years, who had had various occupations such as timekeeper, machine worker, etc., was operated upon Nov. 14, 1939. The entire tip, about 90 grams, of the left frontal lobe was removed. The falx cerebri was exposed for an antero-posterior distance of seven to eight centimeters. The floor of the fossa toward the temporal lobe was cleared, but there remained a shelf of tissue inferiorly over a wing of the sphenoid bone in the anterior fossa. The tumor probably extended beneath the falx and over the corpus callosum into the right frontal lobe, and possibly into the corpus callosum. The patient was alert and happy after the operation. He was readmitted to the hospital in October, 1940 because of a confused state and epileptiform seizures for which dilantin and luminal were administered. The patient was cooperative but slow and apathetic. His Wechsler-Bellevue I.Q. in June, 1941, was 92. He was predominantly right-handed.

Eight normal controls were used with an average age of 35.1 years and a range of 18 to 53 years. These approximate closely the age of the experimental group. The educational level of the controls in terms of the number of grades or semesters completed in grade school, high school and college was similar to the patients. The controls were selected from the out-patient clinic at Northwestern University Medical School on the basis of the absence of pathology. They came to the clinic for a physical check-up following an operation, or complaining of colds, minor skin ailments and similar conditions.

PROCEDURES

Only the experiments are described on which the performance of the subjects with cerebral lesions differed from the controls. The following five experiments yielded such results: threshold of perception, interpretation of ambiguous figures, illusions, memory for objects, and figures with reversible perspectives.

Threshold of Perception: Twelve cards, 4 by 4½ inches, were exposed with a tachistoscope. Four of the cards had a meaningful word lettered on them (apples, reason, figure, window); four had a nonsense syllable (zak, rih, wug, teb); and four had a geometrical figure (square, rectangle, triangle, circle). Five additional cards containing modifications of the staircase figure and Rubin's (36) profile and vase figure, which had been used to study the reversals of perspective (see experiment on figures with reversible perspectives), were also presented tachistoscopically to the subjects. The cards were exposed with a Dockeray tachistoscope. This consists of a box, at one end of which the cards are placed, and the other end, 14 inches apart, serves as a viewer for the subject. An Ibsor shutter placed above the viewer transmits light from a 15 watt bulb onto the card at the various speeds and apertures of the shutter. The speeds of the shutter were 8, 20, 40, 100, 200, 500 and 1000 milliseconds. The foot candles of light transmitted by the six apertures which were used were .03, .07, .11, .18, .24 and .30. The experiment was conducted in a room illuminated only by the 15 watt bulb on the tachistoscope. Starting with a high speed shutter and a small aperture, the speed was decreased and the size of the aperture enlarged in progressive stages until the subject could name the word or figure correctly. This was taken as the threshold and expressed in units of foot candles multiplied by the aperture of the shutter; the smaller the value thus obtained, the greater the perceptual acuity.

Interpretation of Ambiguous Figures: Six cards, eight inches square, with non-meaningful figures[2] drawn in black (fig. 2), were presented one at a time to the subject. He was told that some people can see meaningful objects in such figures and was asked to name anything he could see. The test for each figure was discontinued only when the subject insisted that he had named all the objects that he could perceive. The kind of response, the time and the part of the figure to which the subject responded were recorded.

Illusions: A quantitative measure of the size of the Müller-Lyer illusion (fig. 3) was obtained by having the subject match the lengths of the lines between the arrow-heads while the experimenter varied the length of the line with the arrow-heads pointing inward. One of the illusions consisted of black arrows on a light surface and the other of white arrows on a black background. These were viewed through the box of the tachistoscope used in the experiment on the threshold of perception. The black arrows were placed on a transparent glass (or the white arrows were transparent on a black background) and illuminated by an indirect light from the back of .08 of a foot candle in intensity. The nonvariable arrow was 1⅛ inches in length. Each subject was given a total of 16 trials in an ascending and descending order.

Sixteen other illusions[3] (fig. 3) were presented to the subjects during a general interview and they were asked to name the absence or presence of the illusory effect.

[2] These figures were drawn by Miss Lucille Cassell of the Art Department at Northwestern University Medical School.

[3] These were purchased from Stoelting and Co., Chicago, No. 27000. Individual nos. 1, 2, 5, 6, 7, 8, 9, 10, 12, 13, 18, 19, 20, 21, 22 and 24.

Memory for Objects: Fifteen objects, a red wooden box, a bicycle bell, a horseshoe, a red rubber ball, a red wooden ring, a red rubber sink stopper, a spoon, a knife, a fork, a screwdriver, a pair of pliers, a red paper match holder, lock and keys, a wooden board with a nail through it, and a smoking pipe were placed on a large grey cardboard and were exposed for three trials of fifteen seconds each. For the first trial a watch was placed in the center of the articles

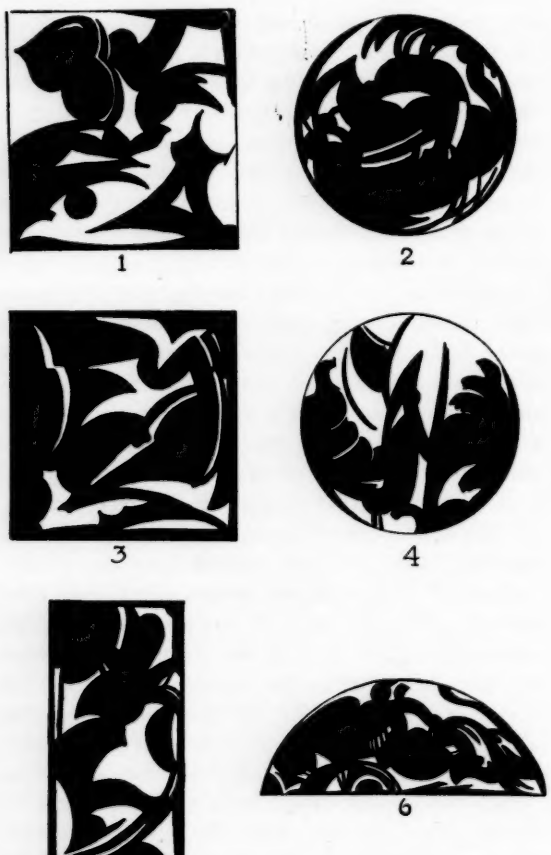

FIG. 2. Ambiguous figures to which the subjects were required to give meaningful associations.

and the subject was instructed to pay close attention to the watch since he would be required to describe it in detail. After the first exposure the subject was asked not only to describe the watch but to mention any of the articles surrounding the watch which he could remember. A second trial was then given in which the subject was instructed to pay attention to the objects surrounding the watch. The third trial was a repetition of the second with the exception that the watch was removed from the center of the cardboard. This method was used in order to determine whether the set which was established to attend to the watch would affect the memory of the subject.

Figures With Reversible Perspective: Nine figures with reversible perspectives (fig. 4), the cube, two modifications of Rubin's vase and profiles, three modifications of the staircase, and three figures purchased from Stoelting and Co. (No. 27000, individual nos. 15, 16, and 17), were presented to the subject and he was asked to describe them. He was then told to look at about the center of the card and to report any change of perspective. If the perspective shifted, the number of shifts was recorded for a minute interval.

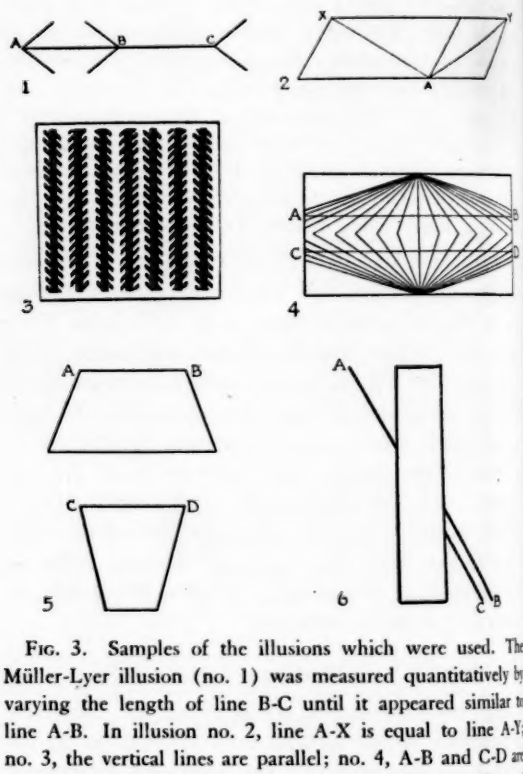

FIG. 3. Samples of the illusions which were used. The Müller-Lyer illusion (no. 1) was measured quantitatively by varying the length of line B-C until it appeared similar to line A-B. In illusion no. 2, line A-X is equal to line A-Y; no. 3, the vertical lines are parallel; no. 4, A-B and C-D are straight parallel lines; no. 5, A-B and C-D are of equal lengths; no. 6, C and not B (as appears in the figure) is a continuation of line A.

RESULTS

The results of the patients with cerebral lesions and the controls on the five experiments which have been described are summarized graphically in figure 5.

Threshold of Perception: Two patients, nos. 2 and 3, with lesions of the right frontal lobe whose threshold of perception was tested showed a marked inability to perceive rapidly the words or figures which were exposed tachistoscopically as is seen in figure 5. This is not due to defective vision, since the patient with superior vision showed an inferior performance on

the test. This patient, no. 2, showed no choked discs preceding the operation, and his visual acuity was 20/20 for each eye. On the other hand, patient 3 had choked discs preceding the operation. His visual fields were, however, normal before and following the operation, and his visual acuity was 20/30 for each eye which was in part corrected by glasses. Contrary to what might be expected, the average threshold for the geometrical figures and words of patient 2 was 229 and of patient 3, 134; that is, he required a greater

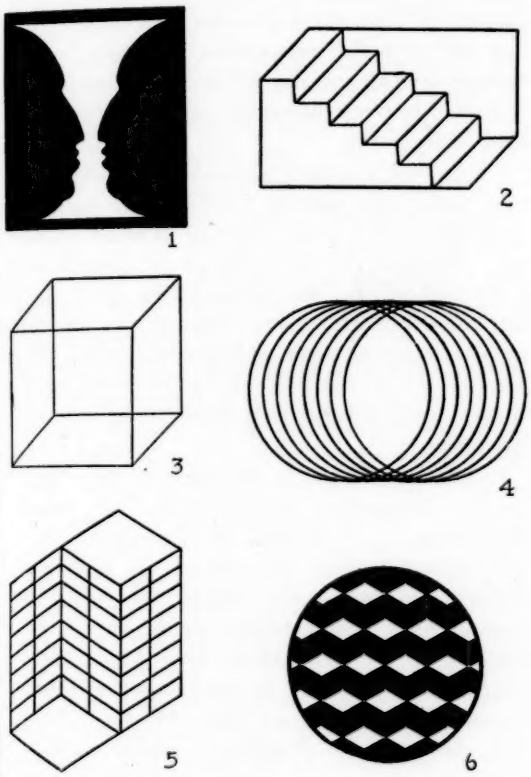

FIG. 4. Samples of figures with reversible perspectives used in the study (no. 1 is a modification of Rubin's figure). Fixating the center of a figure will eventually result in a fluctuation of perspectives.

amount of illumination and a slower exposure to perceive the words or figures than patient 3. The only way in which this difference can be explained is to assume that the effects of cerebral deficiency were greater in patient 2 than in patient 3. The other test results showed that such was the case. The ability to recall objects and the number of reversals on the figures with reversible perspectives were almost within the normal range for patient 3 and much higher than for patient 2. Furthermore, patient 2 showed a mild emotional disturbance following the operation, whereas patient 3 did not.

Interpretation of Ambiguous Figures: The patients with cerebral lesions were not able to perceive as many meaningful objects in the ambiguous figures as the controls. The five patients with cerebral lesions perceived on an average 4.8 objects in the six figures, and the controls, 26.0 (fig. 5). The paucity of responses was present in the patients even when the test was repeated at a number of different sessions, and even when the patients were finally told that the number of responses given by them was below average.

Illusions: The patients with cerebral lesions exaggerate the Müller-Lyer illusion. They make an average error of 9.2 millimeters, and the controls of 6.0 millimeters (fig. 5). On the 16 illusions which were not measured quantitatively but by the presence or absence of the illusory effects, the patient with cerebral lesions were not able to perceive as many of the illusions as

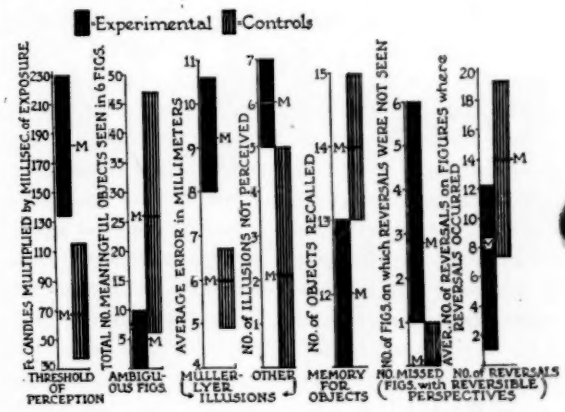
Experimental
Controls
M. CANDLES MULTIPLIED by MILLISEC. of EXPOSURE
THRESHOLD OF PERCEPTION
TOTAL NO. MEANINGFUL OBJECTS SEEN in 6 FIGS.
AMBIGUOUS FIGS.
AVERAGE ERROR in MILLIMETERS
MÜLLER-LYER ILLUSIONS
NO. of ILLUSIONS NOT PERCEIVED
OTHER
NO. of OBJECTS RECALLED
MEMORY FOR OBJECTS
NO. of FIGS. on which REVERSALS WERE NOT SEEN
NO. MISSED
AVER. NO. of REVERSALS on FIGURES where REVERSALS OCCURRED
NO. of REVERSALS (FIGS. with REVERSIBLE PERSPECTIVES)

FIG. 5. Showing the range of scores of patients with cerebral lesions and controls on five experiments. The horizontal line through a column marked M shows the mean for the group.

the controls. The average number of illusions which they missed was 6.0 and the average for the controls, 2.1. These results compared with that of the Müller-Lyer illusion appear contradictory, for in the former case the illusion is exaggerated, whereas in the latter situation the illusory effects are frequently absent. Two conditions in the experimental technique might account for this difference. In the first place, the Müller-Lyer illusion was viewed through a tunnel so that few environmental distractions were present, whereas the other illusions were presented during a general interview in an environment with many distractions. The presence or absence of distracting elements might have affected the attentive process of the patients in a different manner than in the case of the controls. In the second place, on the Müller-Lyer illusion, the individual had to make an actual judgment as to the equality of the length of the lines as

they were being varied, whereas the other test required only a judgment of the absence or presence of the illusion. One condition forces the patient to make a concise judgment and the other does not. It is possible that any illusory effect would have been exaggerated if the patient actually had to match the stimuli.

Memory for Objects: The patients with cerebral lesions do not recall as many of the visually presented objects as the controls. The controls could recall on the average 14 objects and the experimental group 12 objects (fig. 5). Although this might indicate faulty memory, we do not believe that such is the case since there appeared to be no difference between the experimental and control groups on memory tests conducted by us, and since Ackerly (1) and Rylander (37) have shown that immediate memory is not affected in patients with lesions of the frontal lobe.

One of the reasons for the defective recall of visually presented objects may be due to the inability of the patients to shift readily from one object to the other. Thus the patients are unable to learn the objects because they do not see as many of them in the given length of time. The watch placed among the objects on the first two trials might have facilitated this tendency. Another reason for the defective memory may be the incapacity of the patients to form proper categories between the objects. For example, spoon, knife, and fork can be assigned to the category of kitchen utensils; the rubber ball and sink stopper may be placed in the category of similar materials; the red box, red rubber ball, and red match folder may be associated with color. Should the ability to make such associations be affected, the number of objects remembered would be decreased. There is general agreement among the various experimenters, as has been pointed out, that patients with cerebral lesions are defective in perceiving such categories. This was also indicated in our results. When the number of articles which had no associative values were counted we found that the subjects with cerebral lesions named on the average of 6.0 objects in succession which belonged to no category, whereas the controls named on the average only 1.6 objects in this fashion. The most striking example of the absence of any associative method to remember the objects was shown by one of the patients who attempted to remember the objects by their position. When the screen was lowered he pointed to the relative position which each object occupied in attempting to recall them, disregarding the associative values which they held.

Figures With Reversible Perspectives: The patients with cerebral lesions are unable to perceive as many reversals of the figures with reversible perspectives as the controls. On the average the experimental group reported no reversals of perspective on 2.8 of the figures, but only one control was unable to perceive the fluctuations on one of the figures, or an average of 0.1 for the group. On those figures which yielded reversals, the average number of fluctuations in one minute for the experimental group was 8.3 and for the controls 14.1 (fig. 5). Because only the results of those figures on which fluctuations occurred were used in the latter averages, they are somewhat misleading. If the total number of fluctuations for each subject had been divided by the total number of figures with reversible perspectives used (those on which fluctuations did and did not occur), a much greater difference between the patients and the controls would have been present.

On this test, patient 3 obtained a score which placed him among the controls in the lower end of the distribution. This patient recalled as many of the visually presented objects as two of the controls in the lower end of the distribution. This result suggests that the same factors were responsible for the results on both tests, and again indicates that on the test for memory for objects, one of the functions which is affected is the ability to shift rapidly from one stimulus to another.

Patient 1 displayed a restitution of the ability to perceive fluctuations on the figures with reversible perspectives. Three months after the operation he was not able to perceive reversals on the staircase and Rubin's vase and profile figures. Six months later some reversals were perceived on the staircase figure but only upon blinking of the eyes. A year later the reversals occurred even in some instances when the patient did not blink his eyes. He never did succeed, however, in obtaining reversals on Rubin's figure.

Emotional Reactions: The euphoric behavior often described in patients with cerebral lesions was present in a mild form in two patients, nos. 1 and 2. This was characterized by increased talkativeness which although dealing indirectly with the context of the topic under discussion had some features of redundancy, by an increased state of irritability, by a general feeling of elation, and by the expression of humor in commonplace events. This last condition was true even of patient 5 who showed some degree of apathy at the time he was tested. Patients 1 and 2 reported that their talkativeness, irritability and general elated behavior was noticed by their friends and members of their families.. They stated that they were actually much happier than they had been preceding the operation. It is of interest that these patients rationalized their mild euphoric condition. Patient 1 stated that he

was happier because he had not become blind as a woman had whom he knew who had undergone a similar operation. Patient 2, who happened to be in the hospital at the same time as patient 3, stated that he was pleased that the operation did not have the deleterious effects on him that it had had on his colleague. As a matter of fact, as indicated from the results, patient 2 showed a greater disturbance than patient 3. The attitudes of these two patients were similar to Sachs' (38) observations that patients with frontal lobe lesions do not realize the gravity of their condition.

The emotional behavior of patient 1 gradually disappeared so that a year after the operation he was no longer talkative and his remarks were relevant to the topic under discussion. He reported that he had become less irritable and no longer experienced a feeling of elation. Since this patient showed a restitution of behavior on the figures with reversible perspectives, the possibility exists that a similar function was in part responsible for the disturbed emotional and perceptual responses.

Aphasia: Patient 5 with the lesion involving the left hemisphere displayed an inability to use certain words. For example, to the question, "What does an aviator do?" he replied, "He runs the motor." He could not substitute the word "fly" for "runs" irrespective of the questions which were asked, the answers to which required the use of the word "fly." He could say that the birds "soar" but could not say that they "fly." It was only with great difficulty that the patient could substitute the word "aeroplane" for "motor."

Besides the asphasic symptoms and mild tendency towards depression, the other test results of patient 5 were similar to the results of the other four patients with lesions in the right hemisphere. The latter results agree with those of Jefferson (26) and Sachs (38) who found that there are no differences in the mental changes between patients with lesions in the dominant and non-dominant hemispheres. It is to be noted, however, that patient 5 was the only one in the group who had not only a lesion of the left hemisphere but also possibly a tumor involving the right hemisphere and the corpus callosum, so that the symptoms shown by him might not have resulted solely from the lobectomy.

None of the other patients displayed aphasic symptoms in the form of patient 5. In this respect our results agree with the observations of others that the lesion must be in the dominant hemisphere to produce aphasia. However, even with the lesion in the non-dominant hemisphere many of the results of the patients resembled certain aphasic symptoms described by Head (20). He states that even after recovery the aphasic patient takes a long time to react; a condition which is similar to the inability of the patients used in these experiments to perceive rapidly the geometrical figures or words exposed tachistoscopically. Head also states that in aphasia symbolic processes are affected. In the experiment on the memory for objects, the results indicated that the patients were unable to form categories in terms of certain abstract classifications such as use, color, materials, etc. The speech of many of Head's patients consisted of jargon (Head's syntactical defects) and in its mild form in a tendency to be nonsensical. Even in its mild form Head used the term semantic aphasia to describe this condition. The talkativeness with many elements of redundancy of patients 1 and 2 described in the preceding section simulates the semantic aphasia of Head's patients. The inability of the patients to perceive meaningful objects in the non-meaningful figures already described, may be considered akin to visual agnosia in the sense that objects which are normally seen in the figures are not perceived by the patient.

COMMENTS

The conclusion that the frontal lobes are primarily concerned with those functions which have been assumed to belong to the field of perception appears irrefutable from the results of the experiments which differentiated the patients with cerebral lesions from the controls. In this connection the results on the visual illusions should be stressed. The term illusion applied to the distortion of visual figures which are normally perceived by everyone as such is actually misleading, since the illusory effects are normal in the sense that they are perceived in the same manner by every individual. Actually the illusions emphasize the fact that many perceptions are organized in a certain predetermined manner, and it is this normal way of responding which leads to the result that the external stimulus pattern is distorted. The factors underlying the way in which illusions are perceived must be the same as those factors which are responsible for all of the individual's perceptions. When the patient with a frontal lobe injury perceives the illusions in an atypical manner, we can then conclude that his normal perceptions in every-day life are affected, but because of the complexity of the external environment they are difficult to detect in his every-day behavior. One of the patients, no. 1, did notice a condition which could be attributed directly to a distortion of the visual field. He had difficulty in descending a circular staircase in the hospital, although he had no difficulty on straight staircases. He described this as an inability

to gauge properly the exact place where he should place his foot on the stair.

The distortion of the visual figures must be considered as being due to certain native properties of either the nervous system or the receptors since not only are they found to be universally present in adult human beings, but they are also present in animals and in children where the opportunity for learning such responses (provided that learning is advanced as an explanation for the illusions) would not be present to any marked extent. Since the illusory effects are modified by frontal lobe lesions, at least in part, their appearance must be due to certain properties of the nervous system. Köhler (28) and other Gestalt psychologists have postulated a number of concepts to explain the functions of the nervous system not only in the production of the illusory phenomena but in perception in general.

Any attempt to state the functions of the nervous system which are responsible for the atypical perceptions following frontal lobe injury would be entirely speculative, since the hypotheses which have been advanced thus far to explain the phenomena of perception in terms of brain functions have been highly theoretical. For this reason it is possible to state the changes which occurred only in such terms as have been made available from the studies of perception in general, with the full realization that referring to the functions from this aspect does not necessarily imply that concomitant physiological processes occur in the brain. Thus, in the first place, the patients with cerebral lesions require a longer time and more illumination than the controls to perceive stimulus situations such as the geometrical figures and the words exposed rapidly with a tachistoscope. In the second place, the number of situations which are perceived are below normal. The patient fails to attach meanings to ambiguous stimulus situations, and he fails to perceive a number of categories in responding to meaningful situations. In the third place, the ability to shift from one stimulus situation to another decreases, as is suggested by the inability to perceive normally the reversals of figures with reversible perspectives, or to remember a large number of visually exposed objects. In the fourth place, the inability of the patients to perceive the visual illusions normally indicates, as has been pointed out, that normal perceptions are distorted.

Conclusions that substantiate the first three points which have been enumerated have been reached at one time or another by a number of investigators, even when they have used entirely different tests from those used in this study. Rylander, for example, reports that patients with cerebral lesions take a longer time to respond. The same conclusion was reached by Head, and it has been suggested in the study of Ackerley. Various experiments on sorting objects (Gelb and Goldstein, Goldstein, Goldstein and Scheerer, Halstead, Nadel and Weigl) have shown that individuals with frontal lobe lesions do not perceive as many categories in sorting objects as the normal individual. Neither do they perceive as many meaningful objects in the ambiguous ink-blots of the Rorschach test (Harrower-Erickson, and Piotrowski). The inability of patients with cerebral lesions to shift readily from one stimulus to another has been described by Ackerly, Golstein, and Harrower.

To state that the results on the visual illusions implies a distortion of perception in general, without being able to state the factors which are responsible for such distortions, is to admit the unsatisfactory state of the knowledge which is available at present as to the factors which are responsible for the appearance of the illusory effects on many of the figures. There is little agreement as to the reasons why illusions occur, although there is a general consensus of opinion that a number of factors must be postulated in order to explain all of the illusory phenomena (44). From the results on the illusions an additional suggestion is warranted. Walters (41) has found that the Müller-Lyer illusion is exaggerated in children, and decreases in size as the individual matures. Compared with the controls, the subjects with cerebral lesions perceived the Müller-Lyer illusion in an exaggerated form. These results suggest that following frontal lobectomies some form of response which appeared earlier in the repertoire of behavior of the individual replaces the more mature adult response.

As can be seen, the postulation of one function alone to explain all of the changes occurring in patients with cerebral lesions, as has been done by Brickner (2), Head (20), Freeman and Watts (6), and Goldstein (12), will not suffice to include all of the observed phenomena. However, many of Goldstein's (11) subsidiary hypotheses may be considered as more nearly accurate. He states that in the abnormal functioning of the nervous system the reactions increase in intensity and duration, the figure and ground relationships are altered, there is a forced responsiveness to stimuli, and the capacity for abstract behavior is affected. In general the individual reverts to the more concrete form of behavior. Again, however, these statements are more nearly descriptive of behavioral changes rather than of functions of the nervous system.

The results of these studies lead us to conclude that many atypical forms of behavior following frontal lobe lesions which have been relegated to categories other

than perception, such as emotions, aphasia, and learning, are probably due largely to the disturbed perceptual processes. Brickner (2), Freeman and Watts (6), and Goldstein (12) in their studies have concluded that many emotional reactions of patients with cerebral lesions are due not to any direct involvement of the emotions, but to the disruption of functions involving such factors as syntheses, foresight, and abstract behavior. The fact that one of our patients showed some restitution of the ability to perceive fluctuations on the figures with reversible perspectives concomitant with the disappearance of euphoria indicates at least that these reactions may be dependent upon the same function. Many of the symptoms which characterized the behavior of the patients even with the lesions in the non-dominant hemisphere were similar to the symptoms described by Head (20) in aphasias, as has been pointed out by one of us (45). These results indicate that many disorders which have been relegated to the category of aphasia may likewise be a secondary manifestation of the disturbed perceptual processes, a viewpoint acceptable to the interpretations of Hughlings Jackson (19), Goldstein (8), and Head (20). In a number of experiments on immediate memory we were also unable to detect any difference between the subjects with cerebral lesions and the controls. Similar results have been reported by Ackerly (1) and Rylander (37). In view of these results it may be concluded that the process of learning or association, if uncomplicated by perceptual factors is not primarily dependent upon the frontal lobes. The inability of primates with bilateral frontal lobectomies to delay a response reported by Jacobsen, Wolfe, and Jackson (25) is obviously not dependent upon immediate memory. There is general agreement among psychologists that a delayed response belongs in the category of "higher mental functions," and presumably is not solely dependent upon memory. Moore (31) as early as 1919 reached the conclusion that in diffuse cortical degeneration little functional relationship exists between immediate memory and the retention of a response, and concludes that, "We find evidences for the distinction of immediate memory and the power of retention as two distinct mental functions." Because of this distinction he listed the delayed response in the category of perception rather than that of learning. Shurrager and Culler (39) have shown that conditioning can be obtained on the spinal level, and it is possible, therefore, that association is a property of all nervous tissue while perception is solely dependent on an intact cerebrum. The inability of various experimenters, as has been pointed out, to detect any pronounced changes in patients with frontal lobe lesions on tests of intelligence or aptitude may be due to the fact that many items of such tests measure either recent learning or long acquired habits, or those functions which are not affected by frontal lobe lesions.

The question naturally arises whether there will be a restitution of functions with the lapse of time after frontal lobectomies. One of the patients showed some recovery from the disturbances which were at first present following the operation. The nature of this recovery, however, presents some interesting features. For the first few months following the operation he could not perceive the reversals on some of the figures with reversible perspectives. Upon repeated testing the patient was able to obtain the reversals upon blinking his eyes. It was only after this method had proved successful for some time that the patient reported the occurrence of some reversals even without blinking his eyes. There are two possible ways of interpreting the reappearance of the normal response. In the first place, the function itself might be reestablished, or in the second place, the function does not reappear but the individual learns to give the normal response by adopting a method of behavior which is not dependent upon the function in question. Thus if the patient with a cerebral lesion is not able to perceive the fluctuations due to some brain functions producing an inability to shift readily from one stimulus to another, as has been suggested, the attention focused on only one aspect of the stimulus can be broken up by some external means such as blinking of the eyes. Another one of the patients could break such "rigidity" by turning the card at an angle to his field of vision. This procedure would produce a reversal of the perspective which he could not otherwise perceive, but even so it would fail to initiate the normal fluctuations between the two perspectives. The possibility exists that if recovery takes place it is produced by the affected function being taken over by parts of the brain with similar functions, a viewpoint which Lashley (29) has expressed, or because an entirely different form of behavior might produce the same end results as that produced by the function which has been affected. Goldstein (10) presents evidence that in patients with cerebral lesions the latter does occur, and such an explanation favors our results.

SUMMARY

The results on a number of experiments of five patients with unilateral lesions of the frontal lobes (one with a lesion of the left lobe and four with lesions of the right lobes) were compared with those of eight normal controls of approximately the same age range and educational status.

On five experiments the following differences were found between the two groups: (1) The subjects with frontal lobe lesions required a longer time and more illumination to perceive geometrical figures and words than the controls. (2) They were unable to perceive as many meaningful objects in ambiguous figures as the controls. (3) The illusory effect of the Müller-Lyer illusion measured quantitatively was exaggerated, and the illusory effects of many other visual illusions were not perceived. (4) The patients were unable to recall as many objects exposed visually as the controls. (5) They were unable to perceive reversals on many of the figures with reversible perspectives, and if reversals occurred their frequency was below average.

The differences between the patients and the controls can be accounted for by postulating that following frontal lobectomies: (1) a longer time is required to perceive a stimulus, (2) the number of situations which are perceived in a stimulus field is decreased, (3) there is an inability to shift readily from one stimulus to another, and (4) there is a distortion of normal perceptions. The results on the visual illusions suggest that when a normal reaction is affected by frontal lobectomy, a response which appeared earlier in the behavior of the individual replaces the mature adult response.

Other forms of atypical behavior were noted as follows: Euphoria was present in two of the experimental subjects. The patient with a lesion of the left frontal lobe showed unmistakable symptoms of aphasia. Many of the reactions of the four patients with lesions of the right lobes were, however, similar to the symptoms which have been described as constituting part of the syndrome of aphasia. It is suggested that symptoms which have often been ascribed as belonging to the fields of emotion and aphasia are due largely to the disturbed perceptual processes.

Immediate memory, as far as could be determined, was not affected in the subjects with frontal lobe lesions. It is, therefore, suggested that association, if uncomplicated by perceptual processes, is not primarily a function of the frontal lobes.

One of the subjects with a lesion of the right lobe showed some restitution of behavior with the lapse of time. There is some evidence to show that a recovery of the function which was affected did not occur, but that substitute behavior produced the same end results as would have been produced by the affected function.

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THE SEXUAL PSYCHOLOGY OF HUMAN HERMAPHRODITES

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This study, which to date encompasses only a review of the English literature on hermaphroditism, is presented in its present incomplete form for two reasons: first, because exigencies of its author's current existence preclude its completion for some time; and, second, because it is designed to serve as a plea to the members of the medical profession, to whose lot the first-hand study of hermaphrodites invariably falls, to consider it hereafter their scientific duty to see that thoroughgoing psychiatric and psychological investigations, in addition to the usual physiological ones, are made of all hermaphroditic individuals who may come to their attention.

VALUES OF THE STUDY

In the field of human sexuality, there are two major domains, the so-called "normal" and "abnormal," in neither of which, as yet, we have definitive answers to even a fraction of the vitally important recurring behavioral question. Thus, regarding the matter of homosexuality, there have been, and are still, two opposed viewpoints concerning its origins. The orthodox sexological view has been that sexual inversion is "constitutionally" rooted; that homosexuals are born, not conditioned; and that hormonal or/and genic imbalances cause homosexuality. These contentions may be found in the writings of such early students as Krafft-Ebing (89), Bloch (20), Ellis (41, 42), Forel (48), Carpenter (27, 28), Moll (108, 109, 110), Robinson (129, 130, 131), and, above all, Hirschfeld (74, 75, 76, 77, 78). They have more recently—and more scientifically—been echoed by such writers as Sorensen (144), Curran (36), Witschi (162, 163, 164), Wright (166, 167, 168), Steinach (146), Sanders (136), Rosanoff (132), Newman (119), Neustadt and Myerson (118), Glass and McKennon (56), Bauer (13), Abrams (1), and Lange (90).

Quite opposed to this constitutional view of homosexuality has been that which insists that the main etiological factors in homosexuality are psychogenic rather than genetic. Such theories have been consistently upheld by diverse analytic thinkers like Freud (50, 51, 52, 53, 54), Stekel (147, 148), Adler (4, 5, 6), Brill (21), Ferenczi (43, 44), Wittels (161), Schilder (137), London (93, 94), Money-Kyrle (111), and Silverberg (139). They have also recently been sustained by such sociologists, psychologists, and psychiatrists as Pollens (124), Fielding (45), Kinsey (87), Kelly and Terman (86), Davis (39), Hamilton (62, 63, 64), Dean (40), Barahal (12), Kahn (84), Allen (8, 9), and Henry (68, 69, 70, 71, 72, 73).

It is particularly on this question of why some individuals become overtly homosexual—and why others do not—that the study of the sexual psychology of human hermaphrodites may shed much light. For the study of hermaphrodites fortunately provides us with the materials of three crucial human experiments: first, the raising of somatic males and somatic females to act and think as members of the opposite sex to which their bodies and sexual apparatus tend; second, the raising of somatically mixed, masculine-and-feminine, individuals as males, in some cases, and females in others; and, third, the raising of physiological males or females first as members of one sex and later as members of the other. That is to say, human hermaphrodites who have an essentially male or female somatic makeup are frequently reared as members of the sex opposite to the one in which they should, on purely physiological grounds, be raised. Also, *true* hermaphrodites, who are born with mixed, masculine-and-feminine somatic characteristics, including ovotestes, are rather haphazardly raised as either males or females. Again, hermaphrodites occasionally are first raised as members of one sex, and later induced to change their habits and assume the outward dress and manners of members of the other sex.

Therefore, in the case of hermaphrodites we often have a beautiful experimental situation all set up for us; and all that we need is to throw added light on the question of normal and abnormal sexual behavior is to observe the sexual psychology they display. That, on the basis of the information already recorded about human hermaphrodites, is what we shall try to do in the rest of this study; and that, we hope, will hereafter be far more completely done in regard to hermaphrodites who turn up in doctors' offices and who at present are examined and reported upon more physiologically than psychologically.

THE KINDS AND CLASSES OF HERMAPHRODITES

Since terminology regarding hermaphrodites has been, to date, neither consistent nor limited, we define our own usage as follows. A *hermaphrodite* is an individual who possesses both male and female external

and/or internal sex organs. A *true* hermaphrodite is one possessing both male and female gonadal tissue—such as an ovary and a testis or an ovotestis. A *pseudohermaphrodite* has masculine-feminine genitalia or reproductive organs, but only has ovarian *or* testicular tissue. A *male pseudohermaphrodite* has only testicular tissue; and a *female pseudohermaphrodite* only ovarian. A *?true hermaphrodite may* be a true one but, on the basis of all available evidence, is not incontestably so.

We shall make the further distinction in this study, that a *heterosexual hermaphrodite* is one whose sexual desires are directed towards members of the other sex to which he or she has been *raised*. A *homosexual hermaphrodite* is one whose libidinous desires are directed toward members of the same sex in which he or she has been raised. A *bisexual hermaphrodite* is one, no matter how reared, whose sex desires are directed towards both males and females. A *psychosexually immature hermaphrodite* is one who has virtually no sex desires of either a heterosexual or a homosexual nature.

THE MODERN CONCEPTION OF HERMAPHRODITISM

As a result of a good deal of recent experimentation with the production of artificial hermaphroditism in lower animals by indirect and direct androgenization or estrogenization, it is commonly assumed today that most or all human hermaphrodites are genetic females who are masculinized by some extraordinary physiological influence, such as hyper-functioning of the adreno-cortical syndrome (McCahey (98, 99, 100), Vines (153), Young (169, 170, 173, 174), Bell (15, 16, 17, 18) Greene (57), Ramsey and McCahey (126), Reinberger and Simkins (127), Severinghaus (138), Smith and Stockwell (141), Witschi (162, 163)). It is usually also assumed or inferred today that the sex hormones are the direct active agent in masculinization or feminization of an originally genetic male or female [Lillie (91), Nissen (120), Riddle and Dunham (128), Danforth (37), Greene, Burrill and Ivy (58), Adams (2), Lipschutz (92), Humphrey (80, 81), Sand (135), Steinach (146), and Burns (24)]. However, very recent work by Moore (112, 113, 114) and Rubin (133) has brought out the fact that, in mammals, the genic substances themselves, rather than sex hormones, may cause primary sex differentiation, and hence incite hermaphroditism.

In any event, whether human hermaphroditism is fundamentally caused by direct genic factors or by hormonal imbalances (which themselves may be genetically caused), there seems little doubt that it is a somatic anomaly with deep physiological roots. The crucial question therefore arises: should not the same physiological factors which disturbed the soma of the hermaphrodite so drastically, equally affect his or her psyche? If, as has been contended by many reputable geneticists, biologists, and psychiatrists, the direction of the human sex drive depends primarily on hormonal or genetic factors; if homosexuality actually is rooted in physiological rather than psychogenic influences, would it not then be reasonable to expect heavily masculinized hermaphrodites usually or invariably to have masculine libidos and very feminized ones to have feminine libidos.

Our premise is this: If masculinized hermaphrodites, no matter how they are raised, generally acquire a masculine libido, feminized ones a feminine libido, and masculine-feminine ones a bisexual libido, then the case for the constitutional determination of the direction of sexuality is practically proved; but if trends opposite to these are consistently shown, the case for the psychogenic determination of the direction of human sex drives seems much the better one. Let us now look at the facts in this connection, to see which, if either, of these cases can best be made.

PREVIOUS STUDIES OF THE FACTS

There have been, to date, no special reviews of the facts of hermaphroditism to determine their heterosexuality or homosexuality. However, the older writers on the subject—such as Simpson (140), Taussig (150), Windle (160), Burrage (25), Claiborne (32) and Steinach (146)—were of the definite opinion that hermaphrodites usually or invariably displayed a sexuality that conformed to their somatic characteristics, and particularly their gonads, rather than to the manner in which they had been reared. Other students of the subject, including most of the more recent ones, have inclined to the opposite view, and contended that social and cultural factors have been the most influential in determining the kind of sexuality that hermaphrodites display. These opinions may be read in the works of Das (38), Bell (17, 18), Neugebauer (117), Kaufmann (55), Finkler (47), Greenhill and Schmitz (59), H. Mc C. Young (175, 176), Stein (145), Allen and Broster (8), and Young (170).

PROCEDURE OF THIS STUDY OF HERMAPHRODITES

The purpose of this study has been to glean out of the existing reliable medical accounts of hermaphroditism only those that pass the following requirements. First: the hermaphrodite studied must have passed or entered the pubertal period, so that some form of libidinous desire or display may be reasonably expected from him or her. Second: there must be a definite case report on the libido of the hermaphrodite studied.

Third: there must also be a report on, or a clear indication of, the hermaphrodite's general sex role—that is, his or her general masculine or feminine behavior. Fourth: there must be a definite statement—usually backed up by a laparotomy and histological examination of the gonads—on the hermaphrodite's internal sex organs and ovarian or/and testicular tissue. Fifth: there must be a reliable description of the external sex organs and secondary sexual characteristics of the subject.

Keeping to these rigid requirements, it has been so far found that, of well over a thousand reports in the English literature on hermaphroditism, only 84 have been suitable for this study. These 84 cases are somewhat heavily weighted with true hermaphrodites (20) and ?true hermaphrodites (19): because, although both these types are actually much rarer than pseudohermaphrodites, their very uniqueness causes them, when discovered, to be investigated and reported upon in a fairly thorough manner. Pseudohermaphrodites are so relatively plentiful that—most unfortunately for research purposes—only partial information is frequently gathered on them, and that often of an exclusively anatomical nature.

THE FACTS OF THE STUDY

The facts of this study are presented in Table I, which briefly summarizes all the salient information concerning the 84 hermaphrodites analyzed in this paper. Another way of presenting the data, from the standpoint of classifying the human hermaphrodites studied, will be found in Table II.

It may be noted from Table II that of the hermaphrodites reared as males, 87% became heterosexual and 13% remained psychosexually immature. Of those raised as females, 73% ultimately became heterosexual, 11% homosexual, 7% bisexual, and 9% remained psychosexually immature. Apparently, while every hermaphrodite reared as a male was content to maintain a masculine sexuality and/or sex role, a sizeable minority of those raised as females displayed a masculine or mixed sexual attitude. Also, while most of the hermaphrodites studied—as Table I shows—were somatically more masculine than feminine, the decided majority of them, whether they were raised as males or females, turned out to be heterosexual in relation to their *raising*.

Considering for a moment only the pseudohermaphrodites who have only masculine *or* feminine gonads, Table III shows that every one of the male and female pseudohermaphrodites who were raised as males displayed masculine sexuality; while of the twenty-seven male and female pseudohermaphrodites who were raised as females and who showed sex desires, 8 or 30%, displayed masculine (homosexual) or mixed (bisexual) libido. Otherwise analyzed, of the 34 male pseudohermaphrodites studied, 30 (88%) were heterosexual, 3 (9%) were homosexual or bisexual, and 1 (3%) was psychosexually immature. Of the 11 female pseudohermaphrodites investigated, 8 (73%) were heterosexual, 2 (18%) were homosexual or bisexual, and 1 (9%) was psychosexually immature. Yet, according to Table I, nearly all the pseudohermaphrodites, both male and female, were somatically preponderantly masculinized.

It will be noted from Table IV that the percentage of heterosexuals among the pseudohermaphrodites, ?true hermaphrodites and true hermaphrodites studied is rather even. Also, a Chi-square analysis of the pseudohermaphrodites and the true hermaphrodites—the two groups about which our information is most complete, and which may be considered dichotomous—gives a comfortably high probability (50% for one degree of freedom) of homogeneity between them in relation to the traits of heterosexuality on the one hand and homosexuality or bisexuality, and psychosexual immaturity on the other.

Unfortunately, we have no comparable figures on non-hermaphrodites with which to compare those in Table IV. Roughly speaking, it may be estimated that, among "normal" men and women, from 3 to 5% are overtly homosexual or bisexual, and a like percentage are psychosexually immature. If the 5% estimates were correct, a Chi-square analysis of our total group of hermaphrodites and the estimated equivalent group of normals would indicate homogeneity between the two groups ($p.=.20$ for two degrees of freedom). In other words, there is nothing in our data to indicate that there is a significant difference between the amount of sexual deviation—homosexuality, bisexuality, and psychosexual immaturity—to be found among these hermaphrodites and among a presumably representative group of non-hermaphrodites.

Table V gives, in more detail, the direction of sexuality of all the hermaphrodites studied. It will be seen that of the hermaphrodites who displayed definite libido, 89% were heterosexual. The true hermaphrodites accounted for three of the five homosexuals in this study, but included *none* of the three bisexuals found. However, these true hermaphrodites are precisely the ones whom one would expect, on theoretical grounds, to display bisexuality.

Eleven per cent of all the hermaphrodites studied were found to be extremely psychosexually immature. This comprised 9% of those raised as females and 13% of those raised as males. In the only comparable study, Landis (89a) found that 15% of the normal

TABLE I

Case	1835: Handyside (65)	1898: Clark (33)	1911: Tuffier and Lapointe (25)	1917: Caturani (29)	1917: Wiener (158)	1919: Stein (145)	1924: Christopher (31)	1925: Bell (17)	1931: Woodman (165)	1935: O'Farrell (122)	1935: Novak (121)	1937: Chapple (30)	1937a: Young (170)	1937b: Young (170)	1937c: Young (170)	1938: Rubovits and Saphir (134)	1938: Mishell (106)	1938: Carlisle and Geiger (26)	1939: Crossen (35)	1942b: Witschi and Menger (164)	1942a: Witschi and Menger (164)	1942: Finesinger, Meigs and Sulkowitch (46)
Age	33	42	20	26	18	31	17	31	25	19	19	18	26	21	18	39	35	20	28	24	26	17
Raised as	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
Type of Hermaphrodite	MPs	MPs	MPs	MPs	MPs	MPs	MPs	FPs	MPs	FPs	MPs	MPs	MPs	MPs	FPs	MPs	MPs	MPs	MPs	MPs	MPs	MPs
Body Build	M	F	F+	F	F	M-F	MPs	F+	M	M+	M	F+	M-F	M	M	F	F+	F	M-F	F	F	M
External Sex Organs	F-M	F-	M-	F-	F-	M-	F	F-	F-M	M-F	M-F	F-M	M-F	F-M	F-M	F-M	F	F	F-M	M-	M-	M-F
Internal Sex Organs	M	M	M-	F-	M-	M	M-	F-	M	F-	M	M	M	M	F-	M	M	M	M	M-	M-	M
Gonads	M	M	M-	M-	M	M	M	F-	M	F-	M-	M-	M	M	F-	M-	M-	M	M	M	M-	M
Hair	F	F	...	F	...	F-M	...	M	F	M+	...	F	F-	F	M	M	F	F	M	M	F	F-M
Menstruation	M	F	M	M	M	M	M	(M)	M-	M-	M	(M)	M	M	M	M-	M-	M	M-	M	M	M
Sperm Production	M	(M)	(F)	(F)	(F)	...	(F)	(F)	(F)	(F)	(F)	(F)	...	...	...	(F)	F	...	(F)	(F)	(F)	(F)
Libido	F+	F	F	F-	F	F	F	F	F	F	F+	F++	F+	F	F	F+	F	F-	F+	F	F	F
Sex Role	F	F	F	F-	F	F	F	(F)	(F)	F	F+	F+	F+	F	F	(F)	F+	(F)	F	F	F+	F
												HETEROSEXUAL										

F = Feminine. M-F = Masculine-Feminine. MPs = Male Pseudohermaphrodite. (M) = Presumably Masculine. T = True Hermaphrodite. O = Psychosexually Immature.
M = Masculine. MF = Ovotestis. FPs = Female Pseudohermaphrodite. (F) = Presumably Feminine. ?T = ?True Hermaphrodite. F-M = Feminine-Masculine.

PSEUDOHERMAPHRODITES

TABLE I (CONTINUED)

Case	1865: Crecchio (170)	1894: Willett (159)	1897: Stimson (149)	1908: Johnston (83)	1912: Greensfelder and Gatewood (60)	1917: Clark (34)	1922: Mackenzie (95)	1930: McCrea (101)	1931: Middleton (104)	1932: Tung (152)	1937d: Young (170)	1937e: Young (170)	1937: Young & Quinby (170)	1940: Miller & Kenny (105)	1941: Haynes, Thomas and Wheeler (67)	1942: Kozoll (88)	1928: Jackson, Pike and Ashenhurst (82)	1938a: Broster (22)	1933: Adamson (3)	1935: O'Farrell (122)	1938: Broster and Allen (22)	1840: Merry and Cooper (103)	1938b: Broster (22)
Age	43	44	48	23	27	30	38	31	21	20	34	37	31	10	43	18	84	28	19	24	26	86	16
Raised as	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	F	F	F	F	F	F	F
Type of Hermaphrodite	FPs	MPs	MPs	FPs	MPs	MPs	MPs	MPs	MPs	MPs	MPs	MPs	FPs	FPs	FPs	MPs	MPs	MPs	MPs	FPs	FPs	FPs	MPs
Body Build	M	M	M	M	M	M	M	M	M	M	M	M	M-F	M	F	M+	M-F	M	F-M	F-M	M+	F	M
External Sex Organs	M-F	M-F	M-	M-	M-	M-	M-	M+	M-	M	M-F	M-F	M-F	M-F	F-M	M+	M-F	M-F	F-M	M-F	M-F	F-M	F-M
Internal Sex Organs	F	F-M	F-M	F	F-M	F-M	M	F-M	M	F-M	M	M	F	F-M	F	F-M	F-M	M	M	F-	F-	F	F-
Gonads	F-	M-	M-	F-	M-	M	M	M	M	M	M	M	F-	F	F	M-	M	M-	M	I	F-	F-	M-
Hair	M	M	M	M	...	M-	M	M+	M+	M	M	M	M-F	M+	F	F	M	M	F-M	M+	M+	F	F-
Menstruation	...	(M)	(M)	(M)	(M)	M	(M)	(M)	(M)	(M)	(M)	M	...	(M)	F	(M)	(M)	M	M	M	M	...	M
Sperm Production	F	(M)	(M)	(M)	M	...	...	...	...	M-	F	M	M-	...	(F)	...	...	...	...	(F)	F	(F)	(F)
Libido	M+	M	M	M	M	M	M	M	M	M	M	M	M	M	M-	M	M	M-	M-F	F-M	M-F	O	O
Sex Role	M+	(M)	(M)	M	(M)	M	M	(M)	M	M	M	M	M	M	M	M	M+	M+	M+	F-	M+	F	M-F
	HETEROSEXUAL																HOMOSEXUAL		BISEXUAL			PSYCHO-SEXUALLY IMMATURE	

F = Feminine. M = Masculine. M-F = Masculine-Feminine. MF = Ovotestis. MPs = Male Pseudohermaphrodite. FPs = Female Pseudohermaphrodite. (M) = Presumably Masculine. (F) = Presumably Feminine. T = True Hermaphrodite. ?T = ?True Hermaphrodite. O = Psychosexually Immature. F-M = Feminine-Masculine.

PSEUDOHERMAPHRODITES—Continued

TABLE I (CONTINUED)

Case	1902: Garre and Simon (170)	1914: Sinigaglia (170)	1920: Briaux, Lucassagne and Lagoutte (170)	1924: Young (172, 170)	1924: Burden and Masson (23, 96)	1925: Jedlicka (170)	1929: Goedel (170)	1933: Stojalowski & Debski (170)	1936: Warthen and Williams (155)	1936: Lindvall and Wahlgren (170)	1940: Young (171)	1898: Salen (170)	1924: Schauerte (170)	1937: Huggins, Cohen and Harden (79)	1942: Moehlig (107)	1927: Schapiro (170)	1939: Kell, Matthews and Bockman (85)	1939: Smith, Mack and Murray (142)	1911: Gudernatsch (61)	1930: Levi (170)
Age	24	28	28	20	40	19	26	22	60	19	20	43	16	29	14	20	27	19	40	26
Raised as	M	M	M	M	M	M	M	M	M	M	M	F	F	F	F	F	F-M	F⁻	F	F
Type of Hermaphrodite	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
Body Build	M-F	F-M	F⁻	M	F	M-F	M	M⁻	F-M	M-F	M	F	F	M	M	M	F⁺	M⁻	M⁻	M⁻
External Sex Organs	F-M	M⁻	M-F	M-F	F-M	F-M	M-F	M-F	M-F	M⁻	M-F	M-F	M-F	M-F	M-F	F-M	M-F	M-F	F-M	F
Internal Sex Organs	F-M	M-F	F-M	F-M	F-M	M	F-M	F-M	F-M	F⁻	M-F	F-M	F-M	F	F⁻	M-F	F-M	F-M	M⁻	F
Gonads	MF	MF	MF	MF	MF	MF	MF	MF	MF	M-F	M-F	MF	MF	MF	M-F	MF	MF	MF	M-F	M-F
Hair	M⁻	M⁻	F	M	F⁻	M	M	F	M⁻	F⁻	M⁻	...	F	F	F	F⁻	F	F⁻	F	F⁻
Menstruation	F	F⁻	F	M	F	F⁻	...	F	M	F	F	F	F	...	M	M	M⁻	F⁻	M	M
Sperm Production	F	F	...	F	M	F	(F)	M	(F)	F	...	F	...	...	...	F	M⁻	F	...	(F)
Libido	M	M	M	M⁺	M	M	M	M⁺	M⁺	M⁺	M	F	F⁺	F	F	M	M⁺	M⁺	O	O
Sex Role	M	M	M	M	M	M	M	M⁻	M	M	M	F	F	F⁺	F	M⁻	M⁻	M	F	F
	HETEROSEXUAL															HOMOSEXUAL			PSYCHO-SEXUALLY IMMATURE	

F = Feminine. M = Masculine. M-F = Masculine-Feminine. MF = Ovotestis. MPs = Pseudohermaphrodite. FPs = Female Pseudohermaphrodite. (M) = Presumably Masculine. (F) = Presumably Feminine. T = True Hermaphrodite. ?T = ?True Hermaphrodite. O = Psychosexually Immature. F-M = Feminine-Masculine.

TRUE HERMAPHRODITES

TABLE I (CONTINUED)

Case	1830: Ricco (140)	1912: Prince & Whitehead (125, 158)	1921: Moots (115)	1928: Hartley (66)	1929: Albuquerque and Seschalam (7)	1931: Baldwin (10)	1933: McFarland (102)	1835: Bouilland (140)	1852: Banon (11)	1887: Fowler (49)	1896: Beck (14)	1906: Webster (156)	1912: Smith (143)	1933: Urechia and Teposu (170)	1767: Maret (19)	1831: Mayer (140)	1886: Odin (19)	1920: Polano (123)	1935: Morison (116)
	HETEROSEXUAL														PSYCHOSEXUALLY IMMATURE				
Age	80	18	27	22	27	30	45	?	26	27	21	23	28	25	17	80	64	22	26
Raised as	F	F	F	F	F	F	F	M	M	M	M	M	M	M	M	M	M	M	M
Type of Hermaphrodite	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T	?T
Body Build	M-F	F	F-M	F	F	F	F	F	M^-	M	F	(M)	F	F	F^-	M	M	F^+	M-F
External Sex Organs	F	F^-	F^-	F^-	F^-	F^-	F^-	M	F-M	M-F	M-F	M	M-F	M^-	M-F	M^+	M-F	F-M	F-M
Internal Sex Organs	M^-	M-F	F^-	M^-	M	F^-	M^-	F-M	F-M	F	F-M	M	F-M	F	F-M	F-M	M-F	F-M	F
Gonads	? M-F	? M-F	? F-M	? M-F	M-?	? M-F	? M-F	? F-M	? M-F	? M-F	? F-M	? M-F	? M-F	? F-M	? M-F	? M-F	? M-F	? M-F	? M-F
Hair	F	...	M^+	...	...	M-F	...	M	M^-	M^-	F	...	F	F	F	...	F	F	M-F
Menstruation	M	M	F^-	M^-	M	M	F	(M)	M	F	M	M	(M)	M^-	(M)	...	...	F^-	M
Sperm Production	(F)	(F)	(F)	(F)	(F)	(F)	(F)	...	F?	...	...	M	...	M	(M)	...	...	F	...
Libido	F	F	F	F	F	F	F	M	M^-	M	M^+	M	M	M^+	O	O	O	O	O
Sex Role	F	(F)	F	F	(F)	F	F	(M)	M	M	(M)	M	M	M	(M)	(M)	(M)	M-F	(M)

F = Feminine. M-F = Masculine-Feminine. MPs = Male Pseudohermaphrodite. (M) = Presumably Masculine. T = True Hermaphrodite. O = Psychosexually Immature.
M = Masculine MF = Ovotestis. FPs = Female Pseudohermaphrodite. (F) = Presumably Feminine. ?T = ?True Hermaphrodite. F-M = Feminine-Masculine.

? TRUE HERMAPHRODITES

TABLE II

CLASSIFICATION OF HERMAPHRODITES STUDIED

1. Pseudohermaphrodites:		
a) Raised as Males	16	
16 Heterosexual		
b) Raised as Females	29	
22 Heterosexual		
2 Homosexual		
3 Bisexual		
2 Psychosexually Immature		
Total Pseudohermaphrodites	45	(55%)
2. ?True Hermaphrodites:		
a) Raised as Males	12	
7 Heterosexual		
5 Psychosexually Immature		
b) Raised as Females	7	
7 Heterosexual		
Total ?True Hermaphrodites	19	(21%)
3. True Hermaphrodites:		
a) Raised as Males	11	
11 Heterosexual		
b) Raised as Females	9	
4 Heterosexual		
3 Homosexual		
2 Psychosexually Immature		
Total True Hermaphrodites	20	(24%)
Total Hermaphrodites Studied	84	(100%)

TABLE III

CLASSIFICATION OF PSEUDOHERMAPHRODITES

1. Male Pseudohermaphrodites	34	(76%)
a) Raised as Males	11	(33%)
11 Heterosexual		
b) Raised as Females	23	(67%)
19 Heterosexual		
2 Homosexual		
1 Bisexual		
1 Psychosexually Immature		
2. Female Pseudohermaphrodites	11	(24%)
a) Raised as Males	5	(45%)
5 Heterosexual		
b) Raised as Females	6	(55%)
3 Heterosexual		
2 Bisexual		
1 Psychosexually Immature		
Total Pseudohermaphrodites	45	(100%)

women whom he and his associates studied were psychosexually immature; but since the use of the term "psychosexual immaturity" is restricted in the present study to an extreme form of asexuality, there is reason to believe that the 9% of psychosexually immature women found here is really at least as high as the 15% found among normal women by Landis.

It is to be especially noted that not a single one of the eight homosexual and bisexual hermaphrodites mentioned had been raised as males, although five of the nine psychosexually immature had been so raised.

It is also to be marked that of the 25 *male* pseudohermaphrodites who were raised as females, 19 (80%) developed feminine libido, 2 masculine, 1 masculine-feminine, and 1 psychosexually immature libidos. If the direction of sexuality were determined largely or exclusively by the nature of the gonads possessed by an individual—as would seem likely if the hormonal or constitutional theory of sexuality were correct—male pseudohermaphrodites would tend to have masculine libido, and female pseudohermaphrodites feminine libido, no matter how they had been reared.

Table VI classifies the hermaphrodites studied in relation to the kind of sex role they eventually assumed. This sex role, along with the direction of sexuality, was one of the main characteristics with which we were concerned in making this study: if it can be shown that a hermaphrodite's libido and sex role do or do not generally depend on his or her upbringing but rather on their somatic makeup, important deductions may be drawn.

From Table VI it will be seen that of the 84 hermaphrodites studied, only two assumed a masculine-feminine, or mixed, sex role; although, as according to Table I, 14 had a mixed body-build, 52 had mixed external sex organs, 32 had mixed internal sex organs, 39 had mixed gonads, and 5 had mixed hair distribution. Moreover, of the two who did assume a masculine-feminine sex role, neither was homosexual or bisexual. Again, neither of these two was a true hermaphrodite, one being a male pseudohermaphrodite and the other a ?true one. Both were psychosexually immature.

It may be further seen from Table VI that every single heterosexual hermaphrodite displayed a hetero-

TABLE IV

CLASSIFICATION OF HERMAPHRODITES ACCORDING TO DISPLAYED SEXUALITY

Class of hermaphrodite	Heterosexual		Homosexual or bisexual		Psychosexually immature	
	No.	Per cent	No.	Per cent	No.	Per cent
Pseudohermaphrodites	38	85	5	11	2	4
?True Hermaphrodites	14	74	0	0	5	26
True Hermaphrodites	15	75	3	15	2	10
Total Hermaphrodites	67	80	8	9	9	11

sexual sex role: that is, every one raised as a male took on a masculine role and everyone raised as a female, a feminine one. Of the three bisexuals, two had a masculine or homosexual sex role, and one had a feminine or heterosexual one. In general, there was almost perfect agreement between the sex roles and the libidos displayed by these hermaphrodites—in spite of the fact that there was little agreement between sex roles and libidos on the one hand and any of the somatic characteristics investigated on the other.

Regarding the relationship between the various somatic traits listed in Table I, and the upbringing and sexuality of the hermaphrodites studied, we have prepared a good many tables which are too long to be presented in this summary article. We epitomize their results as follows:

TABLE V

DIRECTION OF SEXUALITY OF HERMAPHRODITES

1. Heterosexual:			
a) True Hermaphrodites	15		
4 Raised as Females			
11 Raised as Males			
b) ?True Hermaphrodites	14		
7 Raised as Females			
7 Raised as Males			
c) Pseudohermaphrodites	38		
22 Raised as Females			
3 Female Pseudohermaphrodites			
19 Male Pseudohermaphrodites			
16 Raised as Males			
5 Female Pseudohermaphrodites			
11 Male Pseudohermaphrodites			
Total Heterosexual Hermaphrodites	67	(79%)	(89%)
2. Homosexual:			
a) Pseudohermaphrodites	2		
2 Raised as Females			
2 Male Pseudohermaphrodites			
b) True Hermaphrodites	3		
3 Raised as Females			
Total Homosexual Hermaphrodites	5	(6%)	(7%)
3. Bisexual:			
a) Pseudohermaphrodites	3		
3 Raised as Females			
2 Female Pseudohermaphrodites			
1 Male Pseudohermaphrodite			
Total Bisexual Hermaphrodites	3	(4%)	(4%)
			(100%)
4. Psychosexually Immature:			
a) Pseudohermaphrodites	2		
2 Raised as Females			
1 Female Pseudohermaphrodite			
1 Male Pseudohermaphrodite			
b) ?True Hermaphrodites	5		
5 Raised as Males			
c) True Hermaphrodites	2		
2 Raised as Females			
Total Psychosexually Immature Hermaphrodites	9	(11%)	
Total Hermaphrodites	84	(100%)	

Upbringing. Of the 34 hermaphrodites raised as males who had libido, all had masculine sexuality. Of the 41 hermaphrodites raised as females, 33 (80%) had feminine sexuality, 5 (12%) masculine sexuality, and 3 (8%) masculine-feminine sexuality. Of the 22 pseudohermaphrodites raised as females who displayed feminine (heterosexual) libido, 19 (80%) were actually *male* pseudohermaphrodites. Of the 16 pseudoher-

maphrodites raised as males who displayed masculine (heterosexual) libido, 5 (31%) were actually *female* pseudohermaphrodites.

Body Build. Of the 67 heterosexual hermaphrodites studied, 29 (43%) had a masculine body build, 28 (42%) a feminine, and 10 (15%) a masculine-feminine one. Of the 8 homosexual and bisexual hermaphrodites, 4 (50%) had a masculine, 1 (12½%) a feminine, and 3 (37½%) a masculine-feminine body build. Of the 9 psychosexually immature hermaphrodites, 5 (55%) had a masculine, 3 (33%) a feminine, and 1 (11%) a masculine-feminine body build.

External Sex Organs. Of the hermaphrodites investigated who had definite libido, 59% had masculine-feminine external sex organs, but only 4% were bisexual. Every one of the five homosexual and three bisexual types, however, had masculine-feminine external sex organs; while every hermaphrodite possessing clearly defined masculine external genitalia and libido was heterosexually inclined.

Internal Sex Organs. Although more hermaphrodites had masculine-feminine sex organs than either masculine *or* feminine, none of these mixed types was bisexual. On the contrary, one of the three discovered

TABLE VI

THE SEX ROLES OF HERMAPHRODITES

1. Possessing a Masculine Sex Role:		
a) Heterosexual Hermaphrodites	34	
16 Pseudohermaphrodites Raised as Males		
4 Female Pseudohermaphrodites		
12 Male Pseudohermaphrodites		
7 ?True Hermaphrodites Raised as Males		
11 True Hermaphrodites Raised as Males		
b) Psychosexually Immature Hermaphrodites	4	
4 ?True Hermaphrodites Raised as Males		
c) Homosexual Hermaphrodites	5	
2 Pseudohermaphrodites Raised as Females		
2 Male Pseudohermaphrodites		
3 True Hermaphrodites Raised as Females		
d) Bisexual Hermaphrodites	2	
2 Pseudohermaphrodites Raised as Females		
1 Male Pseudohermaphrodite		
1 Female Pseudohermaphrodite		
Total Hermaphrodites Assuming a Masculine Sex Role	45	(54%)
2. Possessing a Feminine Sex Role:		
a) Heterosexual Hermaphrodites	33	
22 Pseudohermaphrodites Raised as Females		
3 Female Pseudohermaphrodites		
19 Male Pseudohermaphrodites		
7 ?True Hermaphrodites Raised as Females		
4 True Hermaphrodites Raised as Females		
b) Psychosexually Immature Hermaphrodites	3	
1 Pseudohermaphrodite Raised as Female		
1 Female Pseudohermaphrodite		
2 True Hermaphrodites Raised as Females		
c) Bisexual Hermaphrodites	1	
1 Pseudohermaphrodite Raised as Female		
1 Female Pseudohermaphrodite		
Total Hermaphrodites Assuming a Feminine Sex Role	37	(44%)
3. Possessing a Masculine-Feminine Sex Role:		
a) Psychosexually Immature Hermaphrodites	2	
1 Pseudohermaphrodite Raised as Female		
1 Male Pseudohermaphrodite		
1 ?True Hermaphrodite Raised as Male		
Total Hermaphrodites Assuming a Masculine-Feminine Sex Role	2	(2%)
Total Hermaphrodites	84	(100%)

bisexuals had quite masculine internal sex organs and the other two had feminine ones. Considering only hermaphrodites with definite libido, it is found that those with masculine internal sex organs were 93% heterosexual and 7% homosexual or bisexual; those with feminine internal organs were 89% heterosexual and 11% homosexual or bisexual; and those with masculine-feminine sex organs were 86% heterosexual and 14% homosexual or bisexual.

Gonads. Of the 75 hermaphrodites studied who displayed definite libido, those possessing masculine gonads were 91% heterosexual and 9% homosexual or bisexual; those with feminine gonads were 80% heterosexual and 20% homosexual or bisexual; and those with masculine-feminine gonads (true hermaphrodites) were 91% heterosexual and 9% homosexual or bisexual. None of the three bisexuals possessed masculine-feminine gonads: one having masculine and the other two feminine gonadal attributes. Of the five homosexuals—all of whom, like the bisexuals, had been raised as females—two had masculine gonads and the other three masculine-feminine ones.

Hair Growth and Distribution. All three of the bisexual hermaphrodites studied had masculine hair distribution; and of the five homosexuals, three had feminine and two masculine hair. Of the eight psychosexually immature individuals on whom hair growth data could be found, all had feminine hair distribution. Of the heterosexual hermaphrodites raised as males, 22 had masculine, 9 feminine, and one masculine-feminine hair. Of the 25 heterosexuals raised as females, 16 had feminine hair, 9 masculine, and 3 masculine-feminine. Of the five hermaphrodites with masculine-feminine hair, four were heterosexual, one psychosexually immature, and none homosexual or bisexual.

Menstruation. Of the 62 heterosexual hermaphrodites on whom menstrual information could be found, 48 (77%) had never menstruated. Of the 8 homosexuals and bisexuals, 7 (87½%) had never menstruated. And of the 6 psychosexually immature individuals, 5 (83⅓%) had no menstruation.

Sperm Production. Of the three homosexual hermaphrodites on whom sperm information could be obtained, only one produced sperm; and of the two bisexuals, neither had this ability. Of the heterosexual hermaphrodites raised as males, 11 had sperm production and 11 did not. Of the heterosexual hermaphrodites raised as females, 2 had sperm production and 24 did not.

Sex Hormone Production. Sex hormone assay information could only be obtained for a very small number of the hermaphrodites studied, and then it did not always seem to be reliable. This field of investigation, particularly, is one to which more consideration must be brought in the future clinical study of hermaphrodites.

GENERAL CONCLUSIONS

On the basis of the foregoing data the following tentative conclusions may be drawn:

1. Both pseudohermaphrodites raised as males and as females actually consist largely of male pseudohermaphrodites, and have predominantly male internal and external characteristics. Yet, those raised as males almost exclusively have masculine libido and sex role, and those raised as females have, in the great majority of cases, feminine libido and sex role. This seems to indicate that physiological factors are not decisive in determining the masculinity or femininity of pseudohermaphrodites.

2. ?True hermaphrodites, whether raised as males or females, largely have mixed (masculine-feminine) internal and external characteristics. Yet, a decided majority of those raised as females assume a feminine libido and sex role, and the overwhelming majority of those raised as males assume a masculine libido and sex role. Only one ?true hermaphrodite studied has a clear-cut mixed sex role and none has a mixed libido. This would seem to indicate that biological factors are not decisive in determining the masculinity or femininity of ?true hermaphrodites.

3. True hermaphrodites in this study, whether reared as males or females, always have (by definition) masculine-feminine gonads, and are largely masculine-feminine in their other internal and external characteristics. Yet, the majority of those raised as females have assumed a feminine libido and sex role, and the overwhelming majority of those raised as males have taken on a masculine sex role and libido. Not a single true hermaphrodite studied thus far has acquired a clear-cut mixed sex role or libido. This would seem to show that constitutional factors in themselves are not particularly influential in determining the psychosexual masculinity or femininity of true hermaphrodites.

4. About 6% of the hermaphrodites studied are homosexual (in relation to their upbringing) and 4% are bisexual. These are probably not significantly higher percentages than would be found among groups of non-hermaphrodites or normals. But even were the percentages of sexual deviates among hermaphrodites subsequently shown to be significantly different from that found among normals, this would be only natural in view of the unusual environmental influences which are almost necessarily brought to bear on hermaphrodites because of their physical anomalies. Indeed, considering the facts that hermaphrodites must so often, in our society, psychologically feel their condition; that a keen sense of sexual and personal inadequacy must often be theirs because of their abnor-

malities; and that excitations to homosexual and bisexual participations must frequently befall them as a result of their usually obvious physical deviations from the norm, one would expect to find more homosexuality and bisexuality among them than was actually found in this study. This may be partly the result of inadequate investigation, by the original examiner, of some of the cases studied.

5. All the bisexual and homosexual hermaphrodites reviewed were raised as females. Apparently none of the other hermaphrodites raised as males were willing to assume feminine libidos or sex roles. Part of the explanation for this phenomenon may be found in the fact that European and American societies in which the hermaphrodites in question were raised were ones which, in the main, emphasized male ascendancy and afforded the female a subsidiary social role. An explanation such as this, rather than any biological one, would best seem to fit the facts here. For since human hermaphrodites are haphazardly and unscientifically raised as either males or females merely on the basis of the appearance of their external sex organs at the time of their birth, one would expect to find as many intrinsically feminine cases reared as males as intrinsically masculine cases reared as females. If some of the latter, as this study shows, subsequently go against their feminine upbringing to assume a masculine (homosexual) or a mixed (bisexual) libido, then one would expect to see some of the former turning against their masculine upbringing to assume a feminine (homosexual) or mixed (bisexual) libido. This, however, is not found, and its absence makes one suspect that the purely physiological characteristics of hermaphrodites have relatively little to do with their psychosexual attributes.

6. Of the three individuals of the 84 hermaphrodites studied who have a clearcut bisexual libido, all are pseudohermaphrodites, two being female and one a male pseudohermaphrodite. Of the two who have a clear-cut masculine-feminine sex role, one is a male pseudohermaphrodite and one a ?true hermaphrodite. Moreover, the three hermaphrodites with bisexual libidos do not have mixed sex roles; and the two with mixed sex roles are psychosexually immature and do not have bisexuality. On the other hand, not a single one of the true hermaphrodites studied has a distinctly bisexual libido or sex role. Here again we have a rather clear indication that bisexuality and mixed sex role among hermaphrodites are not constitutionally caused.

7. Although several of the hermaphrodites in this study have medical records showing that first masculine and then feminine, or first feminine and then masculine external sexual characteristics predominated in their makeup, very few of these displayed any concomitant changes in the direction of their sex roles and/or libidos. Broster and Allen (8) also present evidence that few women who develop virilism after puberty simultaneously change their sex desires or sex roles. The inference is again clear that biological factors in themselves have a relatively slight influence in the causation of masculinity or femininity.

8. While somatic factors do not appear to be of primary etiological concern in the production of hermaphroditic homosexuality, bisexuality, and psychosexual immaturity, there would seem to be excellent reason to accord them a decided secondary importance. For the anomalous physical makeup of hermaphrodites is highly influential in determining how satisfactory will be their sexual adjustment to members of the sex opposite to that in which they have been reared, how great will be their feelings of social-sexual inferiority, how changed will be their own picture of themselves, and so on. The fact of a given hermaphrodite's having attributes of the sex other than that in which he or she has been raised, and of being conspicuously "queer" in his or her and others' eyes because of such anomalies, and the influence of what has been sometimes called the body ego on the central ego in this connection, may well account for the individual's resorting to homosexuality, bisexuality, or psychosexual immaturity in order to meet the exigencies of an unusual external and internal situation. In this sense, the problem of "normal" and "abnormal" sexuality in hermaphrodites—as well, of course, as in nonhermaphrodites—is truly a psychosomatic one, whose final answer must be sought in psychophysical researches.

9. It may be inferred from this study of hermaphrodites that while the *power* of the human sex drive may possibly be largely dependent on physiological factors—such as the quantity and/or quality of sex hormone secretion—the *direction* of this drive does not seem to be directly dependent on constitutional elements. Usually, the possession of the secondary sexual characteristics and external sex organs of one sex makes it physically more convenient and pleasurable for the possessor to have sex relations with members of the other sex; cultural patterns of living then reinforce these physical tendencies and heterosexuality results. In man, however, the linkage between physical convenience and heterosexuality is relatively slight, and may be easily upset by environmental or psychological factors. This is shown in the case of normal individuals who are segregated in prisons or on ships or are raised in cultures—such as that prevailing in ancient Greece—which encourage or institutionalize homosexuality or bisexuality. This is also shown, in the present study, in the case of hermaphrodites who are psychologically reared as members of one sex though their somatic characteristics are predominantly those of the other

sex. Physical sexuality, which may well be a genetically determined human endowment, soon develops into a more inclusive psychosexuality, which can only be truly investigated and know on a thoroughly psychosomatic level.

SUMMARY

Eighty-four cases of hermaphroditism from the medical literature are examined, and it is shown that, in the great majority of these, the hermaphrodite assumes a heterosexual libido and sex role that accords primarily not with his or her internal and external somatic characteristics, but rather with his or her masculine or feminine upbringing. This is shown to be true in the case of pseudohermaphrodites, ?true hermaphrodites, and true hermaphrodites. On the basis of these facts, the conclusion is drawn that heterosexuality and homosexuality in hermaphrodites are primarily caused not by direct hormonal or other physiological factors but by environmental ones. Since, however, the hermaphrodite's environment conspicuously includes his somatic anomalies, it is also concluded that the problem of "normal" and "abnormal" sexual behavior among hermaphrodites is importantly a psychosomatic one; as is, too, the broad problem of psychosexuality in normal human beings.

The necessity is also pointed out for a careful consideration of hermaphrodite patients in their psychiatric as well as medical aspects.

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SOME ASPECTS OF FUNCTIONAL DYSPEPSIA IN THE CANADIAN ARMY *

BRIGADIER W. P. WARNER, R.C.A.M.C.

In the early stages of the war one-third to one-half of Canadian soldiers returned from overseas as non-effective were sent back with a diagnosis of duodenal ulcers. That percentage has since decreased but duodenal ulcer is still one of the most common causes of non-effective return.

There has undoubtedly been, since the last war, an increase in the incidence of ulcer in the civilian population. We also know, as Harold Wolff has so clearly demonstrated, that suppressed resentment will cause definite physiological changes in the stomach which may aggravate and perhaps cause an ulcer.

In the Canadian Army there was considerable reason for suppressed resentment. We had a well-trained force which had to be kept inactive for a long time.

For practical purposes, a soldier who comes on sick parade complaining of gastro-intestinal symptoms of some duration is diagnosed in one of two ways: either as a patient with ulcer or as a patient with functional dyspepsia. This latter term is admittedly open to criticism and includes a variety of symptoms.

At the beginning of the war we knew very little about persons suffering from functional dyspepsia. While the general practitioner saw many of these patients in his practice he was never faced with the problem of daily sick-parade. In the early stages of the war the functional dyspeptics were not handled properly, often they went into sick parade, were given some medicine and told to go on their way. We soon found this kind of treatment did no good, and so another system was devised.

The medical officer now has a special sick parade where he handles functional cases. The patient can go either to the medical inspection room or to the medical officer's own quarters where he is given ample time to talk, and a careful history is taken. This history includes his actual symptoms, his feelings about his present assignment and what is going on at home. The doctor encourages him to talk by keeping a friendly and sympathetic attitude. A very high percentage of these cases will talk freely when their confidence is gained. The first step in therapy is to make sure of the diagnosis, and then follows the adjustment of any situational difficulties which may be causing emotional disturbance; it is most important to be sure that there is no organic disease and to assure the patient of this.

It is further possible to divide these functional dyspepsias into three groups. In the first are persons with good heredity, constitution and background. They have had few, if any, psychosomatic complaints in civilian life. It is usually some profound emotional disturbance that brings them to sick parade. If they are given the treatment outlined above there is a high percentage of cure.

In the second group are persons who are constitutionally inadequate as far as their gastro-intestinal tracts are concerned. They have had gastro-intestinal symptoms over a long period of years. While there is no organic pathology, there is still constitutional inadequacy. This group is not well-adapted for soldiering in most cases.

The third group contains the men who are really constitutionally inadequate. They have various psychosomatic symptoms from various systems. They have bad family backgrounds and are psychoneurotic. These cases should be discharged from the Army as soon as possible.

There is a tendency still among some medical officers and certainly a tendency among general practitioners to tell the patient with a functional disturbance that there is nothing organically wrong and to send

* Abstract of paper read before the annual meeting of the American Society for Research in Psychosomatic Problems, Chicago, June, 1944.

him away. The patient then goes to a chiropractor, a quack or anyone who will show interest, for a price, and his condition is never cleared up. However, many thousands of the doctors in the services, because they have so many psychosomatic problems to deal with, effort syndrome, functional dyspepsias and others, are learning that this type of treatment is inadequate. These doctors will be returning to private practice and to medical teaching and will apply this new knowledge.

Discussion

Dr. Sidney A. Portis (Chicago, Illinois): I want to congratulate Colonel Warner on his broad-gauged point of view of the Army situation in Canada. For an individual who has a large job as he has, as consultant to the national defense forces of Canada, to give some time and thought to a subject which is so important and so vital to his Army and our Army and the armies of the world, one cannot give too much commendation.

All of us realize that one of the most infantile types of distress that a patient experiences is the influence of the autonomic nervous system on the gastro-intestinal tract. Why gastro-enterologists, who are supposed to be primed for this thing, have given it wholesale neglect is as well known to you as it is to myself.

Thirty-nine papers are to be given here at the American Gastro-Enterological Association Monday and Tuesday of next week, and one or two papers are going to be devoted to psychosomatic problems. I think it is a great reflection upon our thought when we as gastro-enterologists pay so little attention to the emotional aspects of disease.

The problem of duodenal ulcer, as Colonel Warner has so aptly pointed out, may in many cases have its origin in the emotional system, for it has been demonstrated in the experimental and clinical laboratory that such a thing is possible. However, the emotional aspect is not the only answer to our story in peptic ulcer. There is a multiplicity of other factors. Anybody who has had a large experience in peptic ulcer has been all so often chagrined, after keeping a patient on treatment for several years, to find that the patient has, coexistent with that ulcer, an attack of acute appendicitis. The appendix is removed and the entire ulcer picture subsides.

The same thing may be true of dyskinesia of the biliary tract. While, for the most part, dyskinesia of the biliary tract is of emotional origin, we cannot discount the fact that intra-abdominal reflexes do produce dyskinesia of the gall-bladder. We see it so much in middle-aged individuals with diverticulosis. We see it in pelvic conditions of non-emotional origin.

Dr. Warner has discussed functional disturbances of the gastro-intestinal tract. I feel they should be designated as evidence of disturbed physiology of the gastro-intestinal tract. The symptoms that arise from this dysfunction have a much different connotation than purely that of "functional."

Many of these so-called functional disturbances are concerned with a dysfunction of the small intestine. X-ray evidence is beginning to accumulate to correlate the evidence of allined physiology. How does it manifest itself? It manifests itself by hypertrophy and hyperplasia in atrophy. If you look at a roentgenological picture of a person who has altered function of the small bowel, you will find that the pattern is definitely coarse, many portions of the bowel are distinctly widened because of segmental spasm.

Under the influence of adequate medical management, symptoms related thereto are distinctly improved. This disturbed function accounts for many of the so-called large bowel disturbances which have gone under the misnomer of irritable bowel, fermentative colitis, and any other escape diagnosis that the physician would like to have you believe. But these, for the most part, are the small bowel disturbances. It is very important for us, as physicians, to recognize them. We have studied recently a large group of so-called iron deficiency anemias in which there was no other cause for the iron deficiency anemia except rapid motility of the small intestine.

When the small intestines were slowed down in these individuals by adequate therapy, without any additional iron therapy at all, their anemias as represented by their blood counts returned to near normal.

Finally, I would like to discuss this question of constitutional inadequacy. I don't believe in that terminology. You cannot make me believe that the anatomical structures of the gastro-intestinal tract in some individuals at birth are very much different than others. If you want to bring it into a level of intellectual inadequacy, I will agree with you. Many individuals do not have the ability either to exteriorize or to adjust their emotional household as do other individuals. But when you try to tell me that their tissues are inferior to others, I have never seen adequate proof of this by any physiologist, pathologist, clinician, psychologist or psychiatrist. I think we should get away from the term "constitutional inadequacy," because it means nothing, signifies less.

Finally, I would like to say to those of you who are in the Army, you have a real opportunity, an opportunity that has never been presented to medicine before, to examine and observe at such a close range a group of young individuals who have not been subjected to the emotional tirades and the frustrations of the outside world. Thus, when you can see gastro-intestinal disturbances in their incipiency, you will be able to determine and evaluate much more realistically those that are occurring in later life.

BOOK REVIEWS

Personality and the Behavior Disorders. A Handbook Based on Experimental and Clinical Research. Volume I and II. Edited by J. McV. Hunt. New York, The Ronald Press Company, 1944, 1242 pp. $10.

In an almost encyclopedic endeavor, J. McV. Hunt, the editor, has brought together forty contributors for a representation of the problem of theory, investigative fact and clinical practice from all those scientific fields that have contributed to the knowledge of personality and behavior. Many of the thirty-five chapters survey developments of the last decade in subfields where the details of theory and research are known only to small coteries of workers. Traditional boundaries between the various fields of science have been crossed and the way to progress has been opened: "To assemble this literature and gather the results of this investigation into more compact exposition and to foster this cross-disciplinary approach to the study of personality have been the two principal aims in the design of this work." Part I of the book deals with the theoretical approaches to personality and is followed by the description of the "cross-sectional methods of assessing personality." Part III is one of the best sections of the book, and is introduced by Thomas M. French with a chapter entitled, "Clinical Approach to the Dynamics of Behavior." Leon J. Saul has written the chapter on psychosomatic medicine and gives one of the best, shortest and most informative outlines of this field ever written. It contains, like most of the other chapters, an excellent and carefully prepared bibliography which makes the book helpful to the student beyond the elementary level, and a textbook for the teacher. Volume II is devoted to experimental studies of psychopathology and to a short chapter on the therapy and prevention of behavior disorders.

MARTIN GROTJAHN

RICHARDSON, LAVANGE HUNT: *The Personality of Stutterers.* Evanston, Illinois, Northwestern University, The American Psychological Association, Inc., Psychological Monographs, 1944, **56**: no. 7, 41 pp.

In this short monograph the author presents the results of a comparative study of 30 stutterers and 30 non-stutterers, matched for age, sex, intellectual abilities and college experience. All the subjects were of adolescent and adult age with the average age close to 28 years. Three series of tests were carried out: (1) The Henmon-Nelson Test, which is in the nature of a questionnaire. The questions are established along the lines of Jung's classification of psychological types. (2) The Rorschach Ink-blot Test. (3) Murray's Thematic Apperception Test. The last two projection-type tests are well known.

Approximately one third of the monograph is devoted to the history and points of technique of the tests used. There follows a review of "related researches" which include the studies of McDowell, Johnson, Bender and Meltzer. Extensive details of procedure and results are presented in one illustrative case. Finally, the results of the total experiment are reported and bring out the following findings:

On the Henmon-Nelson Test the stutterers are shown to be "more socially introvertive, more depressed, and less happy-go-lucky than the non-stutterers." There is no significant difference "in thinking introversion," self analysis, day dreaming, nor in emotional stability or instability.

On the Rorschach Tests, which do not lend themselves to statistical interpretation, it was found, nevertheless, that there was a significant difference in the medians for small details (d) but no significant difference in means. There were, however, significant differences in the dispersion of the two groups, namely, in the D, d, Dd, MF and the total number of responses. There was more variability in the stutterers than in non-stutterers. There was less self awareness, spontaneity and impulsiveness in the stutterers. A number of stutterers showed psychoneurotic tendencies.

The Thematic Apperception Tests showed the stutterers to have a desire for achievement in excess of other needs, and also a desire for affection. There is a tendency toward guilt, self punishment and aggressive reactions to frustration.

The author indicates the need of research for the purpose of adapting the Rorschach and Thematic Apperception Tests to group analyses, but their qualitative value and significance are stressed by him. He also formulates the need for recheck on possible personality changes following clinic or speech correction class treatments. There is also an extensive bibliography. There appears to have been no investigation into the early years of these adult stutterers, so that the value of the study lies not in the analysis of psychodynamics but in the thorough testing through well recognized methods of the actual behavior of the subjects.

J. LOUISE DESPERT

LINDNER, ROBERT M.: *Rebel Without a Cause.* New York, Grune & Stratton, 1944, 296 pp. $4.00.

The author has for 5 years studied and treated psychopaths and others with a combination of hypnosis and more or less orthodox psychoanalysis. This book presents in detail the hour-by-hour material as relayed by a hidden microphone to a stenographer in another room (the patient's permission to publish the data was obtained after the completion of treatment). The writer is convincing regarding the advantages of this therapeutic tool, and the results in this and other cases with which he has worked certainly justify the further use of the method—particularly in view of the barrenness of the other means of dealing with the psychopath. "Hypnoanalysis is a radically abbreviated method for the investigation of the personality and the treatment of psychogenic disorders and aberrations of behavior."

The introductory chapter is as lucid a picture of the criminal psychopath as this reviewer has yet read. The genesis of the syndrome, the relationship of these individuals to society, the social implications as regards prevention—these and other points are presented forcefully and effectively. The body of the book consists of the somewhat condensed

transcription of the 46 hours of analytic and hypnotic work. In a final 4½ page summary, Lindner discusses again the problem of the psychopath, and this method of dealing with the problem. Several highly effective final paragraphs contain an unanswerable indictment of society's myopic and destructive fashion of handling crime and criminals.

It is most unfortunate that writing so eloquent, so sincere and so fundamental to the social good remains buried in a text of limited circulation. The millenium will have arrived when material of this sort has as wide an audience as a breakfast-food jingle.

Several minor criticisms are not to be construed as detracting from the high merit of the book. The material as reported bears little resemblance to free association as that term is used in psychoanalysis. Perhaps this is due to the editing. Also, the pioneer work of Aichhorn in psychopathy and delinquency, and the contributions of Staub are not even mentioned though many far less significant works are quoted.

J. LANDER

WALLER, WILLIAM: *Veteran Comes Back*. New York, The Dryden Press, 1944, 316 pp., $2.75.

"The nation which forgets its defenders," said Calvin Coolidge, "will be itself forgotten." This comment of a President has been echoed time and time again in the history of these United States but always just a bit too late. Because he is a veteran of World War I and has had first hand experience with the feelings, expectations and disappointments of the veteran, Professor Waller is peculiarly able to present some of the basic elements in the preparation of a plan for dealing with the veterans of World War II.

The style and content of "Veteran Comes Back" are interesting and thought-provoking. Considerable emphasis is placed initially upon the effects of transforming the civilian into a soldier. The author stresses the effects upon the individual of his loss of individuality, his separation from the life he had adapted himself to lead—from his home, his loved ones. This alteration is his way of life must be met by compensatory adjustments which are to be found in his development of feelings of comradeship with his buddies, in a fatalism centered around a philosophy of "Take the cash and let the credit go."

As a corollary of these changes going on in the civilians turned soldiers, the many alterations in war time civilian society are indicated. War time economics, family relationships, interracial relationships and many other social factors are drastically altered. As a result of these changes the differences between the civilians turned soldier and those who remain in civilian pursuits are even greater than are generally recognized.

Waller then proceeds to consider the reversed procedure. He discusses the change from military status, the processes involved in making a civilian of the former civilian turned soldier. As one reads this section of his book he is sure to be impressed with the fact that the "demilitarizing" process is more than likely fraught with more perils than the creation of a war-time military force. Emphasis is placed by the author upon the development of attitudes of dependence upon leaders; upon his needs for group solidarity feelings with those who like himself have been in military service; and upon his inability to adapt his military training and experiences to civilian life.

The types of adjustment which the veteran must make are specifically discussed with reference to marriages contracted before and during the war and the post-war marital problems. Attention is likewise given to employment and the return to civilian vocations with attendant readjustments. Similarly, the need for readjustment of those who plan to return to schools and colleges for further training is stressed, particularly from the standpoint of the task facing educators who must deal with this problem.

In his third section of the book, Professor Waller discusses at considerable length the history of earlier attempts and failures in dealing with veterans' problems. The important role of veterans' organizations in this readjustment process is considered. Obviously, the veteran tends to have more faith in other veterans and as a result he has always looked upon organizations of men like himself as best qualified to advance his welfare and individual status when organized action is required.

Particularly significant is the point which is stressed again and again regarding the lag between the needs of veterans and the action taken to meet these needs. Action generally begins too late and more often than not serves only the interests of those who are not truly entitled to consideration; the deserving have already been gathered to their fathers. The political implications of this treatment of veterans' problems are discussed. Special mention is made of some examples of failures in attempts to assist veterans and the implications of these for future designs for veterans' assistance.

The final major section of "Veteran Comes Back" is devoted to the thesis of "Helping the veteran to adjust to peace time living." In this portion of the book are discussed some of the characteristics which, in the author's opinion, we may anticipate finding among the returned service men. He presents the elements of a veterans' program which will meet and overcome the deficiencies found in such attempts in earlier wars. Waller's emphasis here is upon a "veterans' program" in contrast to earlier concepts of "veterans' benefits." The importance of establishing "a set of coordinated activities designed to restore the veteran to his place in society" is the prime motif of the book.

All in all, the "Veteran Comes Back" is interesting and representative of one point of view regarding the problems of veterans. It should certainly be read by everyone who is concerned with the returned military personnel even though many of the views displayed will not be accepted by those who see this problem in a different light. In the opinion of this reviewer there are two items that stick out like the proverbial sore thumb—namely, (a) that all returned service people are essentially mal-adjusted and (b) that something special needs to be done to solve their problems as though they were separate and distinct from that of the total society. Neither of these concepts is likely to be true when it is recognized that the Armed Forces actually represent about twenty percent of the total male

population. While such concepts may have been acceptable in preceding wars, they certainly are not in World War II and very possibly their existence in preceding wars may have accounted in part for failure to meet the veterans' needs effectively.

There will doubtless be more books like this, and Waller's is likely to be among the best of them. The solution of the veteran's problem will probably come out of some middle path which emphasizes the need for the reabsorbtion of the veteran as a part of the whole society and an adjustment of a total society prepared to meet its problems in a down-to-earth manner with special consideration for any one group eliminated in favor of the total welfare of the entire nation.

MORTON A. SEIDENFELD

YOST, EDNA: *Normal Lives for the Disabled.* New York, Macmillan Co., 1944, 298 pp. $2.50.

If giving sound, practical guidance on how to help ones self after becoming physically handicapped is a virtue then "Normal Lives for the Disabled" comes near reaching the pinnacle of virtuosity. The book has areas in which many rehabilitationists will experience emotional distress. Yet on the whole one can overlook these as a matter of personal bias. The important fact is that the suggestions and advice given the reader who is physically handicapped are generally sound and above all are quite specific.

The book is divided into four basic sections. Part I, "Making Up Your Mind to Work," may be described thematically by the phrase "God helps those who help themselves." This portion of the discussion is concerned with the mental preparation of the disabled man or woman necessary to accept his or her handicap and re-establish a normal mode of life. In spots this appears to be a bit on the Pollyana side, but perhaps most readers will overlook this and accept the mental hygiene which it contains, in the spirit which the authors intend.

Part II, "Getting Ready for Work," is an especially valuable contribution since it supplies a great deal of guidance relative to the procedures and activities that the handicapped need go through in preparing themselves for a return to socio-economic normalcy. Information regarding Federal, State and local agencies, that offer assistance to the veteran as well as civilian handicapped, is provided. The method of approach for aid, the procurement of Orthopedic Prosthetic appliances are discussed at length. In addition the necessary tact of personal appraisal and the steps in selecting appropriate vocations are dealt with in a pragmatic manner. Of especial interest is a five chapter on "Some Jobs the Disabled Have Chosen."

Part III, "On the Job," deals comprehensively with the job hunting and job finding aspects of the rehabilitation of the handicapped. This is a particularly illuminating portion of the book since it presents in a frank manner many of the attitudes of business and industry toward employment of handicapped personnel. Both the gloomy and the bright side of this situation are covered. Advice in the procurement of a job is offered with special stress being placed on selecting jobs that fit one's handicap and in which the worker can offer dollar services for dollar of compensations. Emphasis is likewise placed upon the attitude of the individual toward his job. The need for maintaining good health, for establishing social adjustment and good personal mental hygiene is clearly defined. Particular stress is placed upon the role of leisure time activities in making the "total situation" of the handicapped worker pleasant and adequate. The importance of personal advancement and the recognition of abilities in which superiority can be achieved is indicated and given its recognition as an essential motivational factor in good job adjustment.

A final portion of the book deals with the topic "What About the Future." This represents a philosophical anticipation of what may happen. The soundness of the views expressed or the events which are forecast are interesting and significant, but only time will tell whether or not they will occur.

On the whole "Normal Lives for the Disabled," is a book that every disabled person should read, and one that every rehabilitationist, medical man, psychologist and social worker can read with profit.

MORTON A. SEIDENFELD

DOUGHERTY, N. F.: *Occupational Planning for Tomorrow,* New York, Richard R. Smith, 1944, 155 pp. $2.75.

If one is willing to accept the viewpoint of the author stated in his introduction that, "Those in power in both government circles and labor unions today would actually oppose a properly functioning personnel department that would really represent and work in the interests of the employees because happy, contented, and loyal employees would not fit in with the plans of these leaders," then perhaps acceptance of the book as a whole may be possible.

Every once in a while, someones seems to be driven by an uncontrollable urge to write a book as a kind of mental catharsis. As one reads *"Occupational Planning for Tomorrow,"* they cannot but hope that Dougherty has gained some relief as a result of committing his thoughts to paper.

The physician, psychologist, educator, or the well informed specialist in industrial management will probably be tempted to close its covers long before reaching its final pages for the simple reason that there is a decided paucity of new ideas accompanied by a plethora of unsubstantiated opinion. True there are occasional quotations but their sources are absent except for such comments as these are the opinions of "a general manager of a very large industry" or "one of the outstanding research engineers in the United States who is also a patron and promoter of a more practical plan of education."

To those who are concerned with the effects of job misplacement, particularly as such events contribute to psychosomatic illness, there will be some surprise at the naive reaction to the use of "Intelligence and Aptitude Tests as a Basis for Selection of Leaders." Such comments as, "It is not uncommon for persons to have high I.Q.'s to be geniuses as well, and yet be psychopaths and very dangerous to society" and "If the human animal is so constituted that he must belong to some kind of group, why is it not common sense to organize along the line of mental capacity or competency," must leave the specialists in fields of

medicine and psychology awed by the general lack of understanding of basic psychological principles in the author. The non-professional reader may likewise experience some disturbance at the distinct totalitarian philosophy that is shown throughout the book.

Other chapters present discussions of such topics as, Apprenticeship Training, Plan for Discovering Executive Potential, Selection and Training of Cooperative Engineers, Executive Training Program. These topics are centered around certain fundamental themes that are repeatedly emphasized. Namely, that the present day policy of obtaining leadership in industry is inadequate because of a failure in the educational programs of our schools and institutions of higher learning; secondly, that there is need for the establishment of a caste system that is based upon the measure I.Q.'s of the total population, thus giving the six percent of I.Q. superior and very superior the assurance of taking their place in society.

Any unfairness to the remaining ninety-four percent of the population in the author's opinion, need not be anticipated since "if the job is properly done with the six percent group, we can rest assured that the ninety-four percent will be taken care of adequately." Some readers may question the extent to which that portion of the six percent special, selected for their intellectual capacities, have thus far adequately cared for the needs of those in that substantial group of ninety-four percent. This the author seems to have overlooked.

The latter portions of *"Occupational Planning for Tomorrow"* deals with such topics as, "Analyzing the Man for the Job and the Job for the Man," "Budgeting Executive Manpower." These two chapters are interesting but present little that is new. The chapters entitled, "Traning in Liberal Arts—Culture" is distinctly indicative of the author's concept of serving the individual needs for cultural backgrounds in his vocational training.

MORTON A. SEIDENFELD

ZILBOORG, GREGORY: *Mind, Medicine and Man.* New York, Harcourt Brace & Co., 1943, 334 pp. $3.50.

The first part of "Mind, Medicine and Man" contains a broad outline of psychoanalysis, which Dr. Zilboorg considers a strictly medical matter: "Is it necessary to be a physician, if you know well how the human mind works? . . . It is more than necessary; it is imperative." (p. 19). "One of the most important functions of the psychiatrist is to make a careful differentiation between a pain or malfunction of physical origin and one of psychological origin." (p. 61).

A masterfully written chapter about the instincts, their development and manifestations contains the statement that "instincts defy definitions, . . . but our inability to define the very thing we wish to discuss should not discourage us. . . . The chemist and physicist still are unable to give a clear-cut definition of what energy or mass is." (p. 79). An impressive analysis of Adler and Jung is given in these few words: "Adler could not wait; he preferred to drop what had already been learned and to take the first available vehicle through which the ego acts: society and civilization, and to build around it a philosophy instead of a working hypothesis. Jung was unable fully to face what he saw; yet he was equally unable to deny what he saw. . . . Jung accepted the existence of a considerable part of the id, but he disindividualized and desexualized it." (p. 184). A somewhat intolerant attitude is revealed by the author in dealing with the idea of the collective unconscious: "It is as if one postulated the existence of collective lungs or brains." (p. 185).

While the first six chapters are on a more popular level, the rest of Dr. Zilboorg's book is unconditionally scientific. Freud's "sociopsychological parallelism," with its possibilities and potential fallacies, illustrates the sociological implications of applied psychoanalysis. The discussion of the death instinct is somewhat cursory: "We need not enter here into arguments for or against this hypothesis. It would seem probable that this is a purely philosophical, not a psychological question." (p. 229).

Dr. Zilboorg rises to full stature in Chapter VIII, "Crime and Punishment." Written, like the great speech in Dostoievsky "Brothers Karamazov," in the form of an address to a jury, it contains some of the most striking and convincing formulations relative to criminal jurisprudence: "It is quite understandable that you should resist anyone who would attempt to transform your wrath against a criminal into the natural human sympathy for the sick." (p. 226). ". . . The law would not claim that there are medical and legal pneumonias, medical and legal fractures of a leg, or medical and legal cases of measles. The distinction is made only in cases of the so-called insanity of those accused of a crime." (p. 273). "It is the fear of the murderer and the hate of him that seem to be the factors underlying the perserverance with which the law insists on a psychiatry of its own." (p. 283).

The author's final question, "Why is it not just as well that they (the insane murderers) were put out of the way by execution?" is answered by his statement that "modern psychiatry can not study dead murderers." This strikes us as being somewhat beside the point. Jurisprudence can not be progressive at one point and regressive at another.

The last chapter, "Psyche, Soul and Religion," is the most interesting, controversial and original part of this stimulating book. It may be summarized by a quotation from an earlier chapter: "The ideal of the fundamental perfectibility of man at the hands of man himself, with the contingent faith in the ultimate achievement of this perfection on this earth, is probably the philosophical and scientific (if it is scientific) equivalent of the religious belief in ultimate salvation." (p. 203). In accordance with French political philosophy, Freud considered religion a violation of the "Contrat Sociale." Broad philosophical systems and the inner empire of religion were of little value to Freud, because in them the individual seemed to him lost. Anything that threatened the autonomy of the individual he treated with skepticism, suspicion and even contempt." (p. 301).

MARTIN GROTJAHN

BOOK NOTES

A National Health Service (The British White Paper). New York, MacMillan Co., 1944, 85 pp. $.75.

This publication is a document of great importance to medicine, medical sociology and public health. Its main purpose is outlined (on page 6): "at this stage of social development, the care of personal health should be put on a new footing and be made available to everybody as a publicly sponsored service." It is also emphasized (on page 9) that "the mental health services should be included" and that "the aim must be to reduce the distinctions drawn between mental ill-health and physical ill-health. . . ." The last statement and its implications are, of special interest from the standpoint of psychosomatic medicine.

A. K. George

Mustard, Henry S.: *An Introduction to Public Health.* Second Edition. New York, MacMillan Co., 1944, 283 pp. $3.25.

This is valuable book, precisely and well written by a man who has had large experience in both the practice and the teaching of public health. It is most useful as textbook for introductory courses at various colleges but also worthwhile to the doctor as a source of first orientation on numerous public health topics.

A. K. George

Small, S. Mouchly: *Symptoms of Personality Disorders.* New York, Family Welfare Association, 1944, 56 pp. $.60.

The Medical Field Agent will find in this book a description of symptoms to be looked for while screening draftees at the Induction Centers. While the authors' objective attitude toward malingerers is praisworthy, the importance of psychosomatic conversions and complaints has not received enough attention. With a set of 10 or 15 standard questions and their responses in the interview situation, the average interview could have been described in a more realistic terms than in the general form which the author has chosen. Although the best way to learn the are of Induction Board examinations is by direct observation of an experienced interviewer, this book can fulfill a useful function.

Martin Grotjahn

Outline of the Amino Acids and Proteins. Edited by Melville Sayun. New York, Reinhold Publishing Corp., 1944, 251 pp. $4.00.

The editor and a staff of contributing authors, each one an authority in his special field have accumulated the contemporary knowledge of amino acids and proteins in a very readable form. Even individuals unconversant with organic chemistry and somewhat hazy about the finer details of physiological chemistry will profit from this book. In its lucid elaboration and coordination of chemical, physiological and clinical facts the book represents a thoroughly up-to-date guide to the problems of metabolism.

K. E. Lande

Goldring, William and Chasis, Herbert: *Hypertension and Hypertensive Diseases.* New York, Commonwealth Fund, 268 pp. $3.50.

This book contains the experience gained by careful clinical study of 6000 patients, studied over a period of years. Various treatments are discussed, with a detailed account of the authors' pioneer investigations in the field.

By contrast there is only one short paragraph dealing with the effect of emotional disturbances on hypertension. A fuller discussion of the psychosomatic aspects of hypertension would have been a valuable addition to the excellent physiological studies.

Martin Grotjahn

Heuer, George J.: *The Treatment of Peptic Ulcer.* Philadelphia, J. B. Lippincott Co., 1944, 118 pp. $3.00.

A title more descriptive of the content of this book would be "The Surgical Treatment of Peptic Ulcer." The author, a surgeon, briefly outlines medical treatment but devotes most of his attention to surgical procedures. The ulcerated stomach is carefully described but the ulcer patient as a person is outside the scope of this work.

Martin Grotjahn

Karpman, Ben: *Case Studies in the Psychopathology of Crime.* Vol. 2. Baltimore, Lord Baltimore Press, 1944, 738 pp.

This book of 738 pages contains four case histories which consist largely of autobiographic material. The value of the book as a contribution to the psychopathology of crime may be judged by the fact that of the 153 dreams successively reported, no associations to any one of these dreams are given.

Martin Grotjahn

Du Bois, Cora: *The People of Alor. A Social-Psychological Study of an East Indian Island.* Minneapolis, University of Minnesota Press, 1944, 654 pp. $7.50.

Cora Du Bois spent approximately two years studying the people of Alor who inhabit one of the Netherlands East Indies islands. Of special interest are the life stories of 8 Alorese men and women interpreted by Abram Kardiner.

Martin Grotjahn

BOOKS RECEIVED

Abramson, David: *Crime and the Human Mind.* New York, Columbia University Press, 1944, 222 pp. $3.00.

Cottrell, Leonard S., and Gallagher, Ruth: *Developments of Social Psychology 1930-1940.* New York, Beason House, 1944, 58 pp. $1.50.

Elsberg, Charles A.: *The Story of a Hospital; The Neurological Institute of New York 1909-1938.* New York, Paul B. Hoeber, 1944, 175 pp. $3.50.

Gesell, Arnold: *The Embryology of Behavior.* New York, Harper, 1944, 248 pp. $5.00.

Hotchkiss, Robert Sherman: *Fertility in Men.* Philadelphia, Lippincott, 1944, 216 pp. $3.50.

KOURENNOFF, P. M.: *Oriental Health Remedies.* San Francisco, P. M. Kourennoff, 1944, 126 pp. $2.00.

KOURENNOFF, P. M.: *The World Healer.* San Francisco, P. M. Kourennoff, 1944, 194 pp. $2.50.

MEAKINS, JONATHAN CAMPBELL: *The Practice of Medicine.* Fourth Edition. St. Louis, C. V. Mosby Company, 1944, 1393 pp. $10.00.

MOORE, DOM THOMAS VERNER, *Personal Mental Hygiene.* New York, Grune & Stratton, 1944, 323 pp. $4.00.

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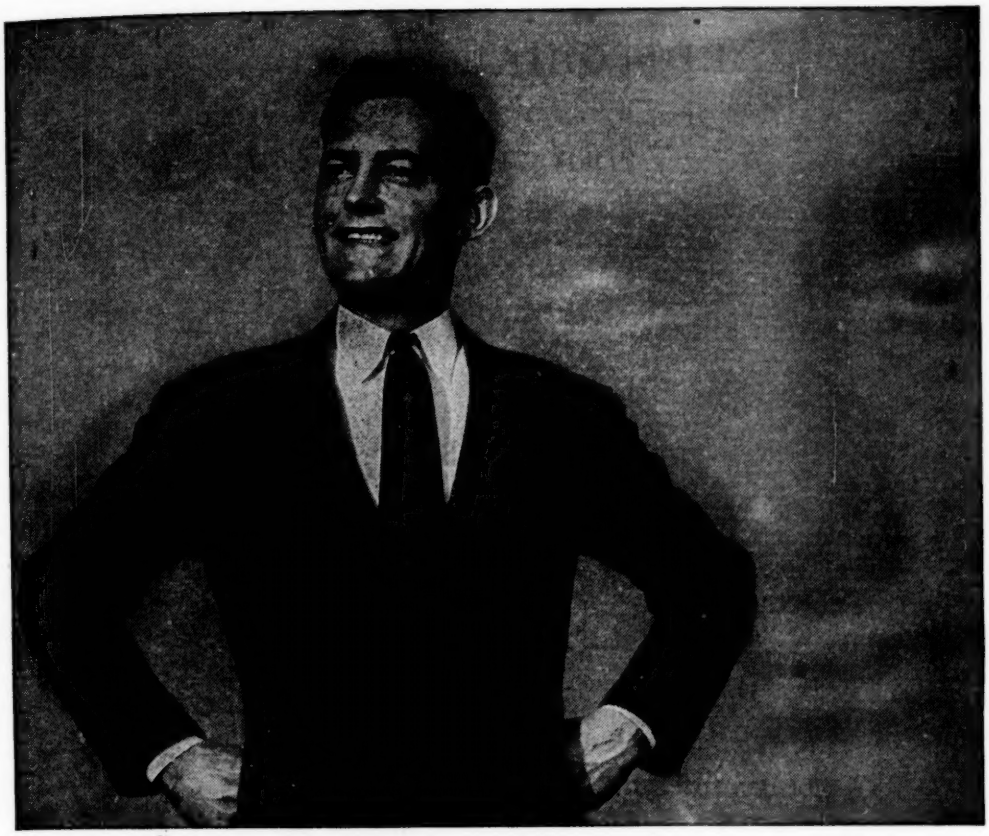
STRECKER, EDWARD A.: *Fundamentals of Psychiatry.* 2nd Edition. Philadelphia, Lippincott, 1944, 219 pp. $3.00.



"...if the individual is depressed..."

"... . if the individual is depressed or anhedonic . . . you can change his attitude . . . by physical means just as surely as you can change his digestion by distressing thought . . . *In other words, drugs and physical therapeutics are just as much psychic agents as good advice and analysis* and must be used together with these latter agents of cure."

**Myerson, A.—*Anhedonia*—
Am. J. Psychiat., July, 1922.**

When this was written—in 1922—the only stimulant drugs employed in the treatment of simple depression were of limited effectiveness.

Only in the last decade has there been available—in Benzedrine Sulfate—a therapeutic weapon capable of alleviating depression, overcoming "chronic fatigue" and breaking the vicious circle of anhedonia.

BENZEDRINE SULFATE TABLETS

(racemic amphetamine sulfate)

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THE INCIDENCE OF PSYCHOSOMATIC AFFECTIONS IN BRITAIN *

JAMES L. HALLIDAY, M.D.

The new man is in a new time under new conditions—Thomas Carlyle, *Sartor Resartus* (1832)

In a previous paper (1943) I described the concept of a psychosomatic affection and noted its value as a working instrument by means of which many seemingly unrelated diseases might be assigned to a unifying etiological category. In the present paper I describe and discuss the incidence of certain "psychosomatic affections" in Britain between 1900 and 1940. This results in a further refining of the concept.

Psychosomatic affections comprise many of the chronic and recurring forms of sickness. They are disorders which incapacitate rather than kill. In only a few does psycho-physiological dysfunction lead to organic change which as an end result may ultimately prove lethal, as sometimes occurs in exophthalmic goiter, peptic ulcer, diabetes and the hypertensive disorders. Statistics of sickness or morbidity should therefore provide the primary source of information. Unfortunately these are rare and those which do exist are often imperfect. The most complete series of morbidity statistics in Britain were those issued by the Department of Health for Scotland for the Scottish insured population during the years 1930-1938, but their compilation was abandoned on the outbreak of the present war.

The statistical data used in this study comprise:

(1) Special investigations of particular affections by individual workers;

(2) Reports on the morbidity statistics of the Scottish insured population, especially an analysis of the trend of chronic sickness (Halliday, 1938);

(3) Mortality statistics of Britain for the five-year periods 1909-1913 and 1934-1938, the interval between these dates comprising a quarter of a century and the era when George V. was king.

The selection of diseases for special study was determined by the availability and suitability of statistical data. Before describing the incidence of various affections two important but little known "key" phenomena require attention: viz., Sex Shift and Age Shift.

* The view of the editors is that psychosomatic medicine is a method of approach which can be applied to the whole field of medicine. It is therefore questioned whether the concept of "psychosomatic affection" is valid. Every disease can be studied from a psychosomatic point of view. The significance of the psychological factors varies only quantitatively in the different conditions. To call a specific disease psychosomatic seems, therefore, arbitrary. Nevertheless, the editors feel that the validity of the article is not affected by the author's use of the expression "psychosomatic affection." —EDITORS' NOTE.

THE PHENOMENA OF SEX SHIFT AND AGE SHIFT IN HISTORICAL TIME

Sex Shift

The term Sex Shift refers to secular changes in the sex ratio. (Sex ratio = male rate divided by female rate.) The phenomenon is illustrated in Table I which shows how in England and Wales the sex ratio for certain diseases changed between 1909-1913 and 1934-1938. During that quarter century exophthalmic goiter—a disease which "normally" preponderates in females—became relatively commoner in males, the 10 times excess in females at the earlier date falling to a 7 times excess at the later date. Suicide, which "normally" preponderates in males, became relatively commoner in females, the excess in males of 3 to 1 at the earlier date diminishing to an excess of only 2 to 1 at the later date. The shift may progress even to the point of complete reversal in sex incidence. For example, diabetes during the late 19th century preponderated in males in the proportion of about 2 to 1; early in the present century the sex incidence became equal, but in 1940 the disease had become about twice as frequent in females. Another case of sex reversal—but in the opposite direction—is provided by peptic ulcer. This happening is described very completely by Jennings (1940) in his study of perforations. Prior to 1900

TABLE I

TO ILLUSTRATE THE PHENOMENON OF SEX SHIFT DURING THE QUARTER CENTURY FROM 1909-1913 TILL 1934-1938 (ENGLAND AND WALES), DEVISED FROM DATA ON TABLE II

	Sex ratio		Approximate sex proportion	
	1909-13	1934-38	1909-13	1934-38
Exophthalmic goiter	0.10	0.15	1 M to 10 F	1 M to 7 F
Peptic ulcer ..	0.85	3.52	1 M to 1 F	3-4 M to 1 F
Diabetes	1.08	0.67	1 M to 1 F	2 M to 3 F
Suicide	3.12	2.28	3 M to 1 F	2 M to 1 F

NOTE: The table is derived from death rates for the simple reason that existing morbidity statistics are inadequate to serve as a primary demonstration of the phenomenon. Suicide (not strictly speaking a psychosomatic affection) is included because being related to "the emotions" it has a cognate theoretical interest.

perforated peptic ulcer preponderated in females; the sex incidence became equal about 1910, and after that there was a progressive increase in the relative male incidence until by 1940 perforated ulcer had become nearly four times as frequent in males as in females.

Age Shift

The term Age Shift refers to secular movements in the position of the age peak. (Age peak = age group showing the maximum frequency of cases.) The phenomenon is graphically illustrated in figure 1 devised from data provided by Jennings in his study of perforated ulcer. In females in 1900 the peak of age incidence was in the younger age groups; *i.e.*, 20-30. After this the trend in females fell, while concomitantly the age peak advanced through the age groups (*i.e.*, shifted to the right) until by 1930 it reached the 60-70 age group. The converse is seen in males. In 1900 the peak of age incidence was in the older groups (50-60) but as the trend rose, the age peak retrogressed (*i.e.*, shifted to the left) until by 1930 it lay in the 20-40 age group.

A consideration of these happenings suggests the following proposition:

A rising trend in the incidence rate (but not necessarily the mortality rate) of psychosomatic affections is accompanied by a retrogression of the peak of maximum age incidence towards the younger age groups, and conversely a falling trend is accompanied by a progression of the age peak towards the older age groups.

This proposition of age-trend inversion may or may not be "true" but it appears to fit—at least partially—and so may be regarded as a tentative and preliminary syntax that enables us to introduce a degree of arrangement into an otherwise chaotic complexity.

To avoid misunderstanding it must be emphasized that the proposition is not directly applicable to mortality rates. Psychosomatic affections are by their nature phasic, recurrent, or chronic, so that death, if and when it occurs, does not usually take place in association with primary onset (as in most infectious diseases and in accidents) but is delayed to a later stage of life. Because of this the age peak of death—in contradistinction to that of incidence—tends "naturally" to be found in the older age groups. As the trend of incidence rises, however, the younger age groups show an increasing death rate, and, if the degree of upward trend is considerable, the extent of the rise in mortality in the middle and younger age groups may come to approach that of the older age groups, or even to exceed it. (For examples, see the Scottish figures for peptic ulcer and suicide in Table III.) In the special case of diabetes, the death postponing effect of insulin congregates deaths in the older age groups and so obscures the evidence of any retrogression of the age-peak which may have been associated with the rising incidence of this disease.

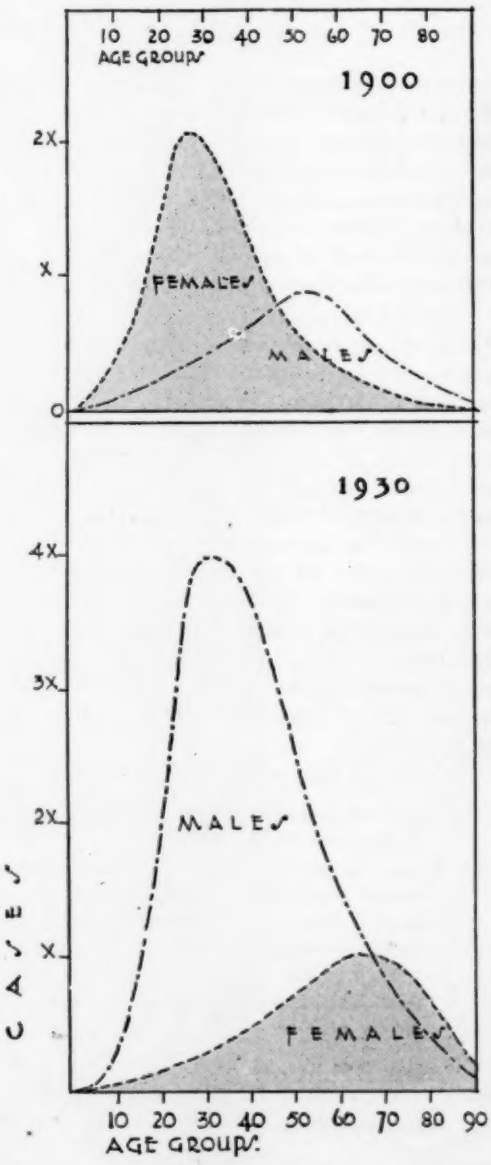

FIG. 1. Illustration of the phenomenon of age-shift, *i.e.*, "progression with falling trend and "retrogression" with rising trend, as exemplified in perforations from peptic ulcer between 1900 and 1930 in the male and female groups. (Based on data collected by Jennings.)

Evidence of age trend inversion in the death rate may however be revealed more clearly through its effects upon the sex ratio. (For example, see peptic ulcer and exophthalmic goiter in Table II.) The

proposition in relation to death rates might therefore be stated as follows:

If the upward trend in the mortality of a psychosomatic affection is greater in one sex than in another, the associated alteration in the sex ratio is most marked in the younger age groups; and conversely, when the downward trend in mortality is more marked in one sex than another the associated alteration in the sex ratio is most marked in the older age groups.

Practical Implications

Appreciation of the Sex Shift and Age Shift in historical time enables us to realize that in the case of psychosomatic affections there can be no standard age and sex incidence applicable to all places (or all groups) at all times. Moreover, it transforms the figures of incidence from mere dead numbers into truly *vital* statistics.

TABLE II

Sex Ratios (Scotland, and England and Wales) 1909-13 and 1934-38, Showing Percentage Increase or Decrease in Death Rates in Various Age-Groups During the Quarter Century Interval

	M. F. ratio 1909-13				M. F. ratio 1934-38				Per cent increase or decrease			
	All ages	15-34	35-54	55 +	All ages	15-34	35-54	55 +	All ages	15-34	35-54	55 +
Peptic Ulcer												
Scotland ..	0.947	0.537	1.060	1.454	3.417	7.0	5.349	2.755	260.824	1203.53	404.62	89.477
England ..	0.852	0.491	1.012	1.541	3.52	5.857	5.192	3.141	313.145	1092.87	413.043	103.828
Exophthalmic Goiter												
Scotland ..	0.095	0.158	0.103	0.00	0.194	0.273	0.20	0.145	104.211	72.785	94.175	—
England ..	0.10	0.105	0.10	0.147	0.152	0.174	0.183	0.141	52.0	65.714	83.0	— 4.082
Diabetes												
Scotland ..	0.951	1.375	1.079	0.936	0.521	1.40	0.742	0.507	— 45.216	1.818	— 31.233	— 45.833
England ..	1.085	1.244	1.14	1.718	0.673	0.955	0.747	0.724	— 37.972	— 23.232	— 34.474	— 57.858
Suicide												
Scotland ..	2.966	2.773	3.218	3.735	2.339	2.184	2.147	3.245	— 21.14	— 21.241	— 33.282	— 13.119
England ..	3.122	2.085	3.154	5.281	2.275	1.846	1.931	3.465	— 27.13	— 11.463	— 38.776	— 34.387

Affections for Which There Is Evidence of an Upward Trend (Great Britain, 1909-13 to 1934-38)

Note: The phrase "the three age groups" refers to the younger age group; viz., 15-34; the middle age group; viz., 35-54; and the older age group; viz., 55 and over.

Gastritis and Peptic Ulcer in Males

A. *Morbidity Statistics*

(a) *Trend and Age.* The epidemiological behavior of "gastric disorders" during the present century in Britain provides a striking paradox; viz., while the incidence rose considerably in males, it declined (though less considerably) in females. In the case of peptic ulcer the increase in males was operating towards the end of the last century (Jennings). In the interval between the two world wars (especially after the financial and unemployment crises of 1929) there seems to have been an acceleration in the rate of upward trend. Figures relating to the British Army have a bearing on this point. In the first 15 months of World War I, medical discharges from gastritis and peptic ulcer numbered only 709, whereas in the first 27 months of World War II, discharges from peptic ulcer alone amounted to 23,574 (Tidy, 1943). The term "duodenal ulcer" was not even mentioned in the official "Medical History of the (first) Great War"! A further statistical glimpse of the accelerated increase in the early nineteen thirties is provided by analysis of the trend of chronic sickness in Scotland (Halliday, 1938). During the five years period 1931-32 to 1935-36 gastric disorders as a reason for incapacity more than doubled in the *chronically* sick; *i.e.*, those who had been on the sick list for a year or more. The percentage increase during this time was as follows: peptic ulcer—all ages, 130; for the three age groups, 126, 168, 92; gastritis—all ages, 110; for the three age groups, 121, 189, 65. It will be noted that the rate of increase was lowest in the older age groups, highest in the middle age groups, and intermediate in the younger age groups—a finding which may exemplify retrogression at the age peak as the incidence increased.

(b) *Sex.* Scottish Morbidity Statistics dealing with the trend of chronic sickness (Report No. 6, 1937) do not indicate the division of the sexes. By the nineteen thirties however the problem of gastric disorders was essentially one of males. It is significant that in the Army during 1940-41 the number of cases of dyspepsia,

both organic and non-organic among female personnel was "so small that any elaborate analysis would be of no value." (Tidy, 1943.)

(c) *Comparison of Contemporaneous Incidence in Different Social Groups.*

(i) *Higher in Bus than in Tram Workers in London, 1937.* Comparing drivers and conductors of London buses with those of London trams, Bradford Hill (1937) showed that the incidence of gastric disorders (including ulcer) was significantly greater in the group of bus workers.

(ii) *Higher in Miners than in Non-miners in Scotland in 1935.* "Gastritis" was twice as common in miners as in non-miners (Halliday, 1943).

(iii) *Higher in Urban Workers than in Rural Workers in Scotland in 1936.* The incidence of gastric affections was "significantly higher in industrial than in rural areas." (Scottish Morbidity Report No. 7, 1938.)

B. *Mortality Statistics* (See Table III)

During the quarter century under review, deaths from peptic ulcer increased in males and declined in females. Throughout the period the disease in both sexes was definitely more frequent in Scotland than in England.

(a) *Trend and Age in Males.* Between 1909-13 and 1934-38 the male death rate in Scotland almost trebled—it rose from 71 to 205; *i.e.,* by 189 per cent; and in England it almost quadrupled—it rose from 46 to 176; *i.e.,* by 283 per cent. Analysis in terms of age groups shows that in Scotland the rise was greatest in the middle-age group (174 per cent) and in England in the older age group (254 per cent) but the rise in the middle-age group was not much less (221 per cent). These results are in consonance with the idea already expressed that although age trend inversion is a phenomenon of morbidity rates, its influence may sometimes be reflected in the mortality rates. Thus, with the increase in the mortality rate of peptic ulcer we see the age peak of deaths tending to retrogress. The tendency is more evident in the Scottish than in the English figures—a finding that will appear in other diseases also.

(b) *Trend and Age in Females.* Between 1909-13 and 1934-38 the female death rate in Scotland fell from 75 to 60; *i.e.,* by 20 per cent, and in England from 54 to 50; *i.e.,* by 8 per cent. In both countries the degree of fall was greatest in the younger age group where it was about 85 per cent, compared with about 40 per cent in the middle-age group. In the older age group there was an actual rise (18 per cent in Scotland and 73 per cent in England). These results probably reflect "progression" of the age peak associated with the falling trend.

(c) *Sex Shift* (see Table III). In 1909-13 the sex incidence of peptic ulcer was approximately equal but by 1934-38 the incidence in males had become between three and four times greater than in females. Analysis in terms of age groups shows that the increase in sex ratio; *i.e.,* the shift towards maleness was greater in the younger age group where it amounted to over 1,000 per cent, as against 400 per cent in the middle-age group and 100 per cent in the older age group. These results indicate retrogression.

(d) *Social Classes.* During the early nineteen thirties the frequency of deaths from peptic ulcer for both sexes was greatest in the labouring class and lowest in the well-to-do class. This is shown in the following table devised from the Registrar General's Decennial Supplement (E & W) Part IIa for 1931:

	I	III	V
M	78	99	117
MW	58	100	118

NOTE: The Roman numeral I refers to the professional and well-to-do section of the population; III to the artisan workers; and V to labouring and unskilled workers. The figures for males of each social class represent the deaths at ages 20-65 in 1930-32 expressed as a percentage of those which would have occurred if the rates of dying at each age had been the same as for all males; and similarly for the married women. That is to say, if social class had been without influence on death rates, each figure would have been 100 instead of the one shown.

THE BODILY DISTURBANCES OF THE PSYCHONEUROSES

(a) *Trend and Age.* The incidence of disabling psychoneurotic illness probably increased to an extent even greater than that of gastric disorders but because of absence of suitable data the increasing trend during the century cannot be given exact statistical form. The evidence consists mainly of statements of experience made by medical men who were engaged in practice over the period. For example, Dickson (1936) who worked in a colliery district of Fife for thirty years noted the large increase "in the incidence of certain disorders compared with the times before the (first) Great War—particularly the number of cases of peptic ulcer and the number of cases of so-called neurasthenia which can now be literally numbered by the dozen." He noted also that the frequency of these disorders (as well as of "discontent") was greatest in the younger man. A statistical glimpse of the rising trend of psychoneurotic illness is provided by my analysis (1938) of the Scottish Morbidity Statistics dealing with chronic sickness during the five years 1930 to 1935. During that period "nervous debility" as a reason for incapacity in the chronically sick rose by nearly 100 per cent. The rate of increase was highest in the younger age group, the percentage increases for the three age groups being 154, 96, 58. Corresponding

increases were also found in respect to certain loosely applied disease-labels, which previous field investigation in insured persons (Halliday, 1935) had shown to cover a high proportion of neurotic illness, *e.g.*, "anaemia" (90, 79, 59); "rheumatism" (89, 90, 31); "cardiac debility" (95, 112, 84).

(b) *Sex.* No statistical information seems to be available for sex incidence in relation to trend. In Scotland in 1935 an investigation of 1,000 insured persons on the sick list examined showed that the incidence of incapacitating psychoneurosis (mainly anxiety states) was similar in both sexes (Halliday, 1935). My clinical impression is that between the two world wars hysteria decreased in women but increased considerably in men. Further research will probably demonstrate that different "syndromes" of neurotic illness (*e.g.*, effort syndrome, "pure hysteria," night blindness, pseudo-rheumatism, etc.) have a different incidence in the two sexes and that the sex ratio for each designated syndrome will show variations in accordance with variations in the communal psychosocial environment, *e.g.*, during industrial depression compared to prosperity, during war compared to peace.

(c) *Comparison of Incidence in Different Social Groups at the Same Time.*

(i) Higher in unemployed persons than in employed persons; higher in persons unemployed for periods longer than three months than those unemployed for a period less than three months; higher in unemployed males than in unemployed females in whom the incidence was actually lower than in females who were at work. (Halliday, 1935.) (In wartime when the factor of employment is both compulsory and general, a different response by the sexes might be expected and, *caeteris paribus*, one would anticipate a decrease of psychoneurotic incapacity in males relative to females and an increase in females relative to males.)

TABLE III

DEATH RATES PER MILLION (SCOTLAND, AND ENGLAND AND WALES) 1909-13 AND 1934-38 SHOWING PERCENTAGE INCREASE OR DECREASE IN DEATH RATES IN VARIOUS AGE GROUPS DURING THE QUARTER CENTURY INTERVAL

		1909-13				1934-38				Per cent increase or decrease			
		All ages	15-34	35-54	55 +	All ages	15-34	35-54	55 +	All ages	15-34	35-54	55 +
Peptic Ulcer													
Scotland	M	71	36	123	282	205	70	337	631	189	94	174	124
	F	75	67	116	194	60	10	63	229	— 20	— 85	— 46	18
England	M	46	27	84	151	176	41	270	534	283	52	221	254
	F	54	55	83	98	50	7	52	170	— 8	— 87	— 37	73
Exophthalmic Goiter													
Scotland	M	2	3	4	—	7	6	13	10	250	100	225	—
	F	21	19	39	45	36	22	65	69	71	16	67	53
England	M	2	2	4	5	10	4	17	24	400	100	325	380
	F	20	19	40	34	66	23	93	170	230	21	133	400
Diabetes													
Scotland	M	97	66	109	442	110	28	69	500	13	— 58	— 37	13
	F	102	48	101	472	211	20	93	987	107	— 58	— 8	109
England	M	115	51	114	614	136	21	59	636	18	— 59	— 48	4
	F	106	41	100	524	202	22	79	879	91	— 46	— 21	68
Suicide													
Scotland	M	86	61	177	254	138	83	234	344	60	36	32	35
	F	29	22	55	68	59	38	109	106	103	73	98	56
England	M	153	98	287	470	182	96	251	492	19	— 2	— 13	47
	F	49	47	91	89	80	52	130	142	63	11	43	60

(ii) Higher in miners than in males who were not miners—in Scotland 1935. (Halliday, 1943.)

(iii) Higher in children of well-to-do parents than in children of poor parents. (Neustatter, 1938.)

EXOPHTHALMIC GOITER

In the absence of morbidity statistics, mortality figures provide the only means of estimating the trend of exophthalmic goiter (see Table III). At the earlier date (1909-13) the disease affected England and Scotland equally but during the succeeding quarter century it increased in both countries especially in males and especially in England.

(a) *Trend and Age in Males.* The male death rate in Scotland more than trebled—it rose from 2 to 7, *i.e.*, by 250 per cent, and in England it quintupled—it

rose from 2 to 10, *i.e.*, by 400 per cent. Analysis of this rise in terms of age groups shows that in Scotland it was greatest in the middle-age group (225 per cent) and in England in the older age group (380 per cent) but the rise in the middle-age group was not much below it (325 per cent). These results suggest a tendency to retrogression.

(b) *Trend and Age in Females.* The female death rate increased in Scotland by 71 per cent and in England by 230 per cent. Analysis of the rise in terms of age groups shows that in Scotland it was greatest in the middle-age group (67 per cent) and in England in the older age group (400 per cent), the rise in the middle-age group being considerably less, viz., 133 per cent. Retrogression is suggested in the results from Scotland.

(c) *Sex Shift* (see Table II). In 1909-13 one male was affected to approximately ten to twelve females, but by 1934-38 one male was affected to approximately seven females. Analysis in terms of age groups shows that the increase in the sex ratio, *i.e.*, the shift toward maleness, was greatest in the middle-age groups where it amounted to 94 per cent in Scotland and 83 per cent in England, as against 73 per cent and 66 per cent in the younger groups. In the older age group there was a slight shift to femaleness. These results indicate retrogression.

(d) *Social Classes.* Occupational analysis for 1931 (see note under "Gastric Disorders") provides figures for married women only. These show that deaths from exophthalmic goiter were highest among the well-to-do and lowest among the poorer classes. The figures were:

	I	III	V
MW	109	103	70

HYPERTENSIVE CARDIOVASCULAR DISORDERS

Psychosomatic affections falling under this heading include essential hypertension as well as a proportion of cases of coronary thrombosis and cerebral haemorrhage. Some writers, *e.g.*, Moschowitz (1943) would include certain cases of arterio-sclerosis and of the "cardiovascular renal syndrome."

A. *Morbidity Statistics*

(a) *Trend and Age.* Figures relating to incidence are scanty, but those available suggest that there has been a rising trend in these disorders in males—if not in females. Morbidity statistics for chronic sickness in Scotland during the five-year period 1930-31 and 1934-35 showed that cerebral haemorrhage increased during that time by 20-30 per cent, the increase being most marked in the younger age group. For the three age groups the percentage increases were 84, 61, and 5. The omnibus label "diseases of the circulation" showed an increase during the same period of 50-60 per cent. For the three age groups the percentage increases were 78, 88, and 35.

(b) *Sex.* Scottish morbidity statistics relating to the trend of chronic sickness do not unfortunately show the division of the sexes. Figures from America relating to candidates for life insurance who were medically examined between 1920 and 1930 to determine the degree of "arterial thickening" were analysed by Sydenstricker (1933). Up to the age of 50 the incidence of "arterial thickening" was greater in males than in females especially in the younger age groups after which the sex incidence was more or less equal. Thus the sex ratio for age group 20-29 was 2; for age group 30-39 it was 1:3; for age group 40-49 it was 1:1 and for age group over 50 it was 1.

An interesting analysis of about 49,000 in-patients of general hospitals (chiefly in the London area) admitted between 1934 and 1938 showed that the diagnosis of "hyperpiesis" revealed an excess in females (Bell 1940). This finding is in striking contrast to what was found for other diagnoses relating to cardiovascular lesions where there was an excess in males, with the exception of mitral stenosis which is well known to be more frequent in females. The actual figures (supplied in a personal communication by Dr. Julia Bell) were as follows:

Diseases showing an excess in females: hyperpiesis M 180; F 294; mitral stenosis M 88; F 200. Diseases showing an excess in males: diseases of the myocardium M 85; F 51; coronary thrombosis and angina pectoris M 107; F 46; cardiovascular lesions M 166; F 126; arterio-sclerosis M 62; F 38.

(c) *Comparison of Incidence between contemporaneous Social Groups.*

(i) Cerebral haemorrhage less frequent in miners than in non-mining males—in Scotland in 1935.

(ii) "Arterial thickening" higher in workers in urban than in rural areas—in America in the twenties (Sydenstricker).

B. *Mortality Statistics*

There are certain difficulties in interpreting death rates from the various diseases that may cover hypertensive disorders of a psychosomatic nature. The labels employed to indicate causes of death are in terms of morbid anatomy—not of etiology—and pathological changes in the cardiovascular system may be the end result not only of hypertension that is psychosomatically determined, but of toxins and of infections, as well as being an apparently "natural" accompaniment to the advancing years of life. Changing fashions in nomenclature may complicate interpretation still

further. A good example of this is provided in the Occupational Mortality Report of 1931 (p. 142) which provides tables showing that the death-rates of judges, barristers, solicitors, clergymen of the Anglican Church, and bank and insurance officials, are very high for "coronary" disease, but are very low from "myocardial disease"! A probable explanation of this superficial absurdity is suggested by the writer of the report. Physician consultants are in the habit of using the term "coronary disease" more frequently than the average general practitioner who sticks to "myocardial disease," and they more frequently are called upon to attend members of the professional classes detailed above who happen to be *in extremis*. In short, the statistics of cardiovascular disease consist, as Sydenstricker put it, of "data which do not mean what they seem to." Because of the complications of interpretation I have refrained from including in Table III a detailed analysis of the statistics of the cardiovascular diseases. Certain general comments may however be made.

The trend of mortality from cardiovascular diseases rose during the present century or else (as in the case of cerebral vascular lesions) declined only slightly. This occurred during a period when the incidence of rheumatic fever and syphilis was rapidly decreasing and when gross spirit drinking was becoming less prevalent. The maintenance of high rates was not confined to the older age-groups. In view of these considerations it is reasonable to adopt as a working hypothesis the theory that the continuation of high rates for the cardiovascular diseases was an expression of an increasing mortality from the hypertensive disorders.

As regards sex, the cardiovascular diseases seem to preponderate in males. Their increasing incidence during the present century probably affected males only. For example, the sex ratio of deaths attributed to angina pectoris and coronary disease (based on standardized rates for England and Wales) was approximately 2 at the end of the nineteenth century, but by the thirties of the present century it had risen to 2.7. Confirmation that the rising trend chiefly affected males is provided in a detailed analysis made by Stocks (1943) in a special study of deaths attributed to one or other of the trio "coronary disease, angina pectoris and disorders of the myocardium" in the age groups 50-65. During the years surveyed, viz., 1930-39, the trend of deaths showed an upward gradient but the rise was confined to males in whom it amounted to as much as 50 per cent during the nine years studied.

Social Classes. Occupational analysis in 1931 (see note under "Gastric Disorders") shows that death from cardiovascular and renal diseases was more frequent in males among the well-to-do and in females among the poor classes. The figures were:

		I	III	V
Cerebral vascular lesion	M	122	100	97
	MW	75	101	109
	SW	—	105	132
Myocarditis, coronary disease, angina pectoris	M	157	95	95
	MW	105	96	109
	SW	—	104	167
Nephritis	M	119	96	97
	MW	74	99	115
	SW	—	94	132

The consistency of social incidence under these three disease headings is very striking.

A somewhat different result is found in the occupational analysis of deaths attributed to "arterio-sclerosis" in that mortality for both sexes was highest in the poorer class. The figures were:

	I	III	V
M	100	97	118
MW	—	96	128

It would seem that the term arterio-sclerosis may be even more composite than that of the other cardiovascular diseases, *e.g.*, it may include a higher proportion of the variety of lesion that is said to be a response to prolonged and severe physical exertion over a period of many years.

DIABETES

In the absence of morbidity statistics, mortality figures provide the only means of estimating the trend of diabetes (see Table III). Between 1909-13 and 1934-38 deaths from diabetes increased slightly in both countries, the increase being definitely greater in females than in males. Throughout the period the disease affected females of both countries equally, but was slightly more frequent in English males.

A valuable account of diabetes mortality in England for the years 1861 to 1942 has been provided by Stocks (1944), who notes how the trend in deaths rose for both sexes until 1915 (the second year of World War I) after which it fell. Insulin was introduced in 1920 and the fall continued thereafter at an accelerated rate until 1927 when it again began to rise, the increase continuing until 1940. He also commented on the reversal of sex incidence. About 1870 the sex incidence in Scotland was two males to one female, but by the late thirties this became one male to two females. Similar examples of sex reversal were found in a number of countries with a "western civilization," *e.g.*, England, U. S. A., Sweden, Holland, and New Zealand.

(a) *Trend and Age in Males* (see Table III). Between 1909-13 and 1934-38 the male death rate from diabetes rose slightly in both countries. Analysis in terms of age groups shows that the rise was confined to the older age group, the younger age group showing a decline of about 60 per cent and the middle-age group of about 40 per cent.

(b) *Trend and Age in Females.* The female death rate from diabetes doubled in both countries. Analysis in terms of age groups shows that the rise was confined entirely to the older age group (109 per cent in Scotland and 68 per cent in England). The younger age group showed a decline (58 per cent in Scotland and 68 per cent in England), and a lesser decline in the middle-age group.

(c) *Sex Shift.* In 1909-13 the sex incidence was approximately equal but by 1934-38 there was a shift to femaleness, almost 2 females being affected for every 1 male. Analysis in terms of age groups shows that the diminution in sex ration (*i.e.*, the shift to femaleness) was for both countries greatest in the older age group (about 50 per cent), being less marked in the middle-age group (about 30 per cent). In the younger age group the shift to femaleness was much less evident in England (22 per cent) and probably non-existent in Scotland.

(d) *Social Classes.* Occupational analysis for 1931 (see note under "Gastric Disorders") shows an interesting distinction between the sexes. In males, death from diabetes was highest among the well-to-do, whereas in females it was highest in the poorer classes. The figures were:

	I	III	V
M	122	95	69
MW	56	104	106
SW	?	93	156

SUICIDE

Between 1909-13 and 1934-38 the death rate from suicide increased in Britain, the rise being more marked in females and more marked in Scotland (see Table III). The disease throughout the period was definitely more frequent in England.

(a) *Trend and Age in Males.* During the quarter century surveyed, the male death rate rose in Scotland by 60 per cent and in England by only 19 per cent. Analysis in terms of age groups shows that in Scotland the rise affected the three age groups more or less equally, the increases being 36, 32, and 35 per cent, whereas in England the older age group alone showed a rise (47 per cent), the younger age groups each showing a slight decline. Retrogression may be reflected in the results from Scotland but the English results seem to reflect progression.

(b) *Trend and Age in Females.* The female death rate from suicide rose by 103 per cent in Scotland and by 63 per cent in England. The rise was greatest in Scotland in the middle-age group (98 per cent), and in England in the older age group (60 per cent), although the middle-age group approximated to it (43 per cent). As in the case of males, the Scottish results reflect retrogression but the English ones seem to reflect progression.

(c) *Sex Shift* (see Table II). In 1909-13 three males were affected to approximately one female, but by 1934-38 only two males to one female. Analysis in terms of age groups shows that the diminution in the sex ratio, *i.e.*, the shift to femaleness, was greatest in the middle-age groups for both countries (about 40 per cent). In the younger age group the shift to femaleness was greater in Scotland (21 per cent) than in England (11 per cent) but in the older age group it was much less in Scotland (7 per cent) than in England (35 per cent). These results from analysis of the sex ratio confirm retrogression in Scotland, but they neither deny nor confirm progression in England.

(d) *Social Classes.* Occupational analysis for 1931 (see note under "Gastric Disorders") shows that deaths from suicide were highest among the well-to-do and lowest among the poorer classes for both males and married women. The figures were:

	I	III	V
M	120	95	87
MW	113	101	92
SW	?	97	100

First Comment

In all the diseases showing an upward trend, "upsetting events" have been shown to be statistically significant as precipitating factors. (This statement may require qualification in respect of diabetes—a term which probably represents a pot-pourri of various disorders of differing etiology—in that a controlled series of patients does not appear to have been examined to determine numerically the influence of "upsetting events." In other words, these diseases are distinguished by being causally associated with environment in its psychological aspects, the part played by external physical factors being indeterminate. That the incidence of these diseases should increase in the population at a time when "upsetting events" in the community in the sense of unrest, insecurity, and loss of objective, *i.e.*, of social disintegration, were increasing accords with what might be expected. A study of the epidemiology of the separate psychosomatic affections will, however, require a further communication. It may be noted here that war, insofar as it provides a common objective and diminishes social disintegration,

might be expected to modify the incidence of some of these affections. This expectation is borne out by the definite decline in Britain during both World Wars of exophthalmic goiter, suicide, and diabetes.

Certain of the diseases which increased en bloc show interesting interrelationships. There is, for example, some kind of connection between psychoneurotic anxiety states, hyperthyroidism and exophthalmic goiter. The trio of peptic ulcer, "fibrositis" and hypertension are commonly found as "associated, alternating, or sequent affections" in the same individual, and the "personality types" in these disorders show certain corresponding characteristics (Halliday, 1943). To find the inter-connection of these affections, first noted in serial investigation of clinical cases, and sustained in their prevalence, illustrates the value of the concept of a psychosomatic affection as a working instrument.

There is no reason to believe that the upward trend of these disorders is an artifact dependent on improved methods of diagnosis or changes in the naming of disease. For example, although the term peptic ulcer has almost certainly been increasingly applied with the increasing employment of finer methods of examination, this consideration can in no way account for the paradox that the incidence in females actually declined while it rose so remarkably in males. The suggestion that improved diagnosis might explain the upward trend of diabetes is inadequate as an interpretation not only of the reversal of sex incidence but also of the signal social finding in the Registrar General's Report of 1931, that in males the mortality rate was highest among the well-to-do classes, whereas in females it was highest among the poorer classes. As regards exophthalmic goiter, is it likely that a diagnosis so externalized should be recorded so much more frequently when George V died than when he ascended the throne?

AFFECTIONS SHOWING A DOWNWARD TREND

Idiopathic Hypochromic Anaemia (females). This disease, formerly known as chlorosis or green sickness, predominates in females. During the last century when its incidence was high the age peak was in the 15-25 age groups. "It now occurs typically in women between 20 and 50 and juvenile cases are rare." (Price, 1942.) This age shift provides an example for progression of the age peak associated with the falling trend in females. The trend in males is unknown.

Peptic Ulcer (females). According to Jennings, peptic ulcer in females had shown a rising incidence during the nineteenth century prior to its decline in the twentieth. Table III shows that the falling death rate between 1909-13 and 1934-38 was associated with progression of the age peak. (See also notes under "Peptic Ulcer in Males.") The trend of female "gastritis" is unknown.

Chorea. The incidence of chorea is a function of the incidence of rheumatic fever which declined during the century. Deaths from rheumatic fever in turn are related to the falling trend in deaths from virulent streptococcal infections, such as scarlet fever and erysipelas (Glover, 1942). Chorea predominates in females in the proportion of 2 to 1, and no change in sex ratio seems to have accompanied the declining incidence. There appears to have been no alteration in the age distribution of onset, which has consistently remained between 5 and 15 years (Paul, 1943).

Second Comment

The diseases showing a downward trend are distinguished by being etiologically associated with environment in its physical aspects. In hypochromic anaemia the external causal agents are said to include a diet deficient in iron or other metals, lack of outdoor exercise, unsuitably tight clothing, etc. In chorea there is a causal relationship with a "rheumatic" streptococcus, as well as with poor living conditions. The particular physical factors of environment related to female peptic ulcer have not yet been determined. It is likely, however, that the term covers more than one disease entity. The "perforating ulcer of young women," so prevalent last century, may represent such an entity. It was apparently often associated with chlorosis (see text books of that period) and may therefore have been associated with similar environmental factors. It has been suggested that both chlorosis and this form of female ulcer have now died out ("become extinct"). However, the correspondence in their epidemiological behaviour in respect of declining incidence and progression of the age peak suggests the possibility that the two diseases, although less frequent, may still survive though in modified modern form. Another entity covered by the term "female peptic ulcer" is probably the equivalent of the ordinary male duodenal ulcer in whose etiology "upsetting events" are highly relevant. The compression of several distinct diseases of differing etiology within a single name of morbid anatomy renders their individual statistical interpretation precarious indeed.

Although a psychological approach has been surmised to be important in understanding the etiology of these affections in individual patients, I am not aware that a controlled series of sufferers from these disorders—with the exception of modern female peptic ulcer—has been investigated to determine how far "the emotions" as a precipitating factor may be regarded as statistically significant. In other words, it is doubtful if chorea and hypochromic anaemia comply

with "the psychosomatic formula" proposited in 1943. A study of their prevalence suggests that in the mass—at least during the period of historical time under survey—the declining incidence of these disorders is related to the concomitant decline in the noxious pressure of communal physical environment. In this respect there is an analogy to pulmonary tuberculosis. In this disease psychiatrists have reported the importance of the emotions as precipitating factors in individual cases, yet in the mass, and in the average case, the theory that physical environment, rather than psychological, is of primary etiological relevance appears best to fit the facts. Yet, having written this, it may be mentioned that during the years following the financial and unemployment crises (*i.e.*, 1930-1935) the Scottish statistics for chronic sickness showed that incapacity due to tuberculosis increased by 20-30 per cent, the increase being greatest in the younger age group. The percentage increases for the three age groups were 42; 18; 2.[1]

Similar considerations apply also to the interpretation of the disease label of "chronic bronchitis"—a term of anatomical location which undoubtedly comprises a number of various disease entities which are of the nature of responses to noxious physical, chemical, and micro-organic agents, as well as to "upsetting events." (For notes on "psychosomatic bronchitis" see my papers 1938, 1943 a.) Although one might expect that variations in the pressure of the psychosocial environment would play but a small part in the determination of the mass incidence of "bronchitis," yet chronic sickness in Scotland attributed to this label between 1930-31 and 1934-35 showed an increase of as much as 70-80 per cent, the rise being most marked in the younger age group. The percentage increases for the three age groups were: 166; 136; 31. It seems legitimate to assume that during this period of historical time the prevalence of "bronchitis" as a reason for incapacity for work was perceptibly determined by the contemporaneous prevalence of upsetting communal events.

[1] *Note on Mortality from Pulmonary Tuberculosis:* Analysis of the mortality from tuberculosis on the lines of Tables II and III shows that the death rate (consistently higher in Scotland than in England) declined during the period 1909-13 and 1934-38. The figures of the percentage increase or decrease of mortality were:

		All ages	15-34	35-54	55 and over
Scotland	M	— 57	— 50	— 51	— 66
	F	— 61	— 46	— 71	— 59
England	M	— 49	— 45	— 49	— 47
	F	— 53	— 30	— 61	— 60

The downward trend was slightly greater in females than in males. Analysis in age groups shows that whereas the decline in males was more or less equal at all age-groups for each country, in females it was least in the younger age groups—being actually less than in males in this age group.

The differential rate of decline between the two sexes affected the sex ratio, which increased in Scotland by 12.8 per cent, and in England by 8 per cent. The percentage increase or decrease in the sex ratio during the period were:

	15-34	35-54	55 and over
Scotland	— 7.7	66.1	307.5
England	— 21.8	28.7	32.5

Analysis in terms of age groups shows that the shift to maleness was greatest in the older age group (especially in Scotland) and that in the younger age group there was actually a slight shift to femaleness (especially in England).

DISEASES WHOSE TREND IS UNCERTAIN

Asthma, Gall-bladder Disease and Rheumatoid Arthritis. A preliminary survey of mortality statistics suggests that certain other disorders tentatively included in the psychosomatic category (*e.g.*, asthma, gall-bladder disease and rheumatoid arthritis) may have shown a rising trend during the period. For example, the death rate from "asthma" (an omnibus term) showed an upward trend for Scotland in both sexes, the degree of increase being most marked in the younger age group. In the case of England the trend however was slightly downward except in the younger age groups where there was little change for either sex. The interpretation of the statistics of gall-bladder disease and rheumatoid arthritis is uncertain, partly because of alterations in the methods of classifying deaths, and partly because of the lack of converging evidence from other sources. A point of interest in rheumatoid arthritis may be mentioned. The older text books seem to imply that the maximum age peak of onset lay in the age group 20-30. Glover's report of 1926 which collects 450 cases shows that the maximum distribution of onset in this series seems to lie between the ages of 20 and 40. A still later analysis in 1943 of about 400 cases by Sclater shows that the age of maximum distribution of onset was between 35 and 44 years. Are these differences in recorded ages of onset an expression of variations in the composition of the samples, or in the standard of diagnosis, or do they represent a progression of the age peak associated with a falling trend? (My clinical impression is that rheumatoid arthritis may have declined—at least in females.)

SUMMARY

(1) This paper is a survey of the incidence in Britain during the present century, and prior to the

outbreak of the present war, of some of the disorders tentatively allotted to the psychosomatic category in virtue of their compliance with "the psychosomatic formula" (1943). An examination of prevalence indicates that the diseases studied fall into two main groups, viz., those with a falling incidence and those with a rising incidence. The divergence in secular trend suggests a broad difference in etiology. The distinction may be stated as follows: In the diseases that decreased (hypochromic anaemia, chorea and female peptic ulcer) environment in its physical aspects is recognized to be of high etiological relevance, whereas in the diseases that increased, it is environment in its psychological aspects that is known to be causally significant, the influence of external physical factors being wholly indeterminate.

(2) The establishment of this distinction, both etiologically and epidemiologically, helps to clarify "the concept of a psychosomatic affection." A refinement of its definition would be as follows: a psychosomatic affection is a disease which complies with the psychosomatic formula and whose prevalence rises or falls in accordance with the rise or fall of communal "upsetting events," *i.e.*, in accordance with the pressure of environment in its psychological aspects.

(3) Diseases which comply with this definition during the period of historical time under review comprise a high proportion of illnesses attributed to the following labels: peptic ulcer and gastritis; psychoneurosis, including anxiety states and hysteria; exophthalmic goiter, the hypertensive cardiovascular disorders (hidden under such terms as hypertension, coronary thrombosis, angina pectoris, diseases of the myocardium, cerebral vascular lesions, arterio-sclerosis, and nephritis), and diabetes.

(4) Analysis of the prevalence of these diseases reveals that their incidence showed an upward trend during the quarter century 1909-13 to 1934-38, a period corresponding to the reign of George V. In anxiety states, exophthalmic goiter, and diabetes the upward trend involved both sexes. The degree of rise was, however, greater in males in exophthalmic goiter, and in females, in diabetes. In peptic ulcer and also perhaps in the hypertensive disorders the upward trend involved males only. In all affections the rate of increase appears to have been most marked in the younger age groups.

(5) The findings as regards changes in sex incidence might be restated as follows: The diseases which preponderated in females during the late nineteenth century (viz., peptic ulcer, exophthalmic goiter—also perhaps hysteria and essential hypertension) became manifested increasingly during the twentieth century in males, whereas the diseases which preponderated in males (viz., diabetes, suicide) became manifested increasingly in females. This finding suggests *inter alia* that the "personality type" of males was becoming more feminine and that of females more masculine.

(6) The incidence of the various separate affections showed considerable variation as between different social groups and classes.

(7) Statistical studies of the incidence of psychosomatic affections require taking account of two key phenomena, viz., Age Shift and Sex Shift. These imply that there can be no standards of age and sex incidence applicable to all places (*i.e.*, all groups) at all times.

(8) A proposition of age-trend inversion is adduced which, although it may or may not be "true," provides an experimental syntax to be proved or disproved by later research. It may be stated as follows: A rising trend in the incidence rate (but not necessarily the mortality rate) of psychosomatic affections is accompanied by a retrogression of the age-peak, *i.e.*, the age of maximum frequency, towards the younger age groups and, conversely, a falling trend is accompanied by a progression of the age-peak towards the older age groups.

(9) A study of the epidemiology of the various separate psychosomatic affections will require a further communication. In the meantime it may be remarked that this *recherche du temps perdu* suggests that much of the "clinical material" so often subsumed under the heading of general medicine is not an eternal invariable but a function of the historical era and the social set-up in which persons happen to live and physicians to practise.

I am indebted to Mr. Wm. Grossart of the Department of Health for Scotland for statistical assistance, and to Dr. Percy Stocks for practical criticism and helpful suggestions.

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ANNOUNCEMENT

A Graduate Course in psychosomatic medicine for the Internist and General Practitioner will be given at Temple University Medical School and Hospital from June 3rd to June 30th, 1945. The teaching staff will consist of:

Dr. Edward Weiss, Professor of Clinical Medicine

Dr. O. Spurgeon English, Professor of Psychiatry

Dr. Gerald H. J. Pearson, Associate Professor of Child Psychiatry Associates and Guest Lecturers

The course is designed to assist internists and practitioners of general medicine in the diagnosis and management of psychoneurotic and psychosomatic problems, and is open to a limited number of qualified physicians.

There will be lectures, seminars, conferences, and clinical work in wards and out-patient departments. The work will be closely supervised, and special lecturers who have had exceptional experience in both civilian and military neuropsychiatry and psychosomatic medicine will participate in the teaching program.

The fee for the course will be $200.00. Persons wishing further information should apply to Dean William N. Parkinson, Temple University Hospital, 3401 North Broad St., Philadelphia 40, Pennsylvania.

THE THERAPEUTIC ROLE OF DRUGS IN THE PROCESS OF REPRESSION, DISSOCIATION AND SYNTHESIS *

LAWRENCE S. KUBIE, M.D., AND SYDNEY MARGOLIN, M.D.

It has long been known that a man off-guard may reveal things that he wants to hide, and that truth may slip out under cover of jest. Nor is it a new discovery that drugs which affect cerebral function can abet this process. The Romans said, "In vino veritas." William James (6) described the "anaesthetic revelation"; and the spinsters' obscenities and the preachers' blasphemies have made of the ether-jag a standing joke. What modern psychiatry has added is the effort to develop systematic techniques for utilizing these well-known facts in the process of therapy, by altering states of feeling and of conscious thought.

In 1919 Freud (1) predicted that if psychotherapy were ever to become as widely available as other forms of medical care, analysts would be compelled to modify analytic technique by returning to experiments with hypnotism. In 1922 (2), and again in 1933 (3), he wrote of the need to use chemical agents to assist psychological levers in coping with the powerful psychological forces at work in certain psychiatric conditions. At the same time, out of the last World War and this one, have come insistent efforts to apply these principles in the treatment of civilian neuroses (*e.g.*, Horsley (5)), and of the neuroses born of combat (*e.g.*, Grinker and Spiegel (4)).

Thus what we are reporting here today stems from several sources: old human wisdom, Charcot, surgical anaesthesia, Freud, and the pharmacology of cerebral function. In the brief time at our disposal we can give no more than an outline of the principles underlying this work, and a few representative illustrations.

We have previously reported on the experimental use of induced hypnagogic reveries as a technique whereby the state of reverie can be maintained without interruption even when painful missing links emerge as conscious recollections (Kubie (7), Kubie and Margolin (8)). Today we want to add the fact that drugs, such as the barbiturates, the cannibis derivatives, scopolamine, alcohol, and the volatile anaesthetics can assist this process through the complex influence which they exercise on several aspects of the psychic apparatus.

Perhaps it is safe to assume that all psychiatrists today, without regard to variations in points of view on therapeutic techniques, recognize that a neurosis arises through the repression of unacceptable ideas, feelings, and impulses, plus the dissociation of their attached energies. This is the essential role of repression and dissociation in the neuroses. An equally obvious fact, however, is usually overlooked: namely, that in every human being there is a continuous effort to lift the repressions and to re-unite (or synthesize) the dissociated components. (One manifestation of this is what Freud called "the return of the repressed.") Thus in all human life there is an incessant and continuous interplay between the processes of repression and dissociation on the one hand, and those of recall, and re-integration or synthesis on the other. The therapeutic utilization of drugs must be understood in terms of their influence on the dynamics of this unstable equilibrium.

In daily living there are many manifestations of this spontaneous but usually unsuccessful effort to restore unity to psychic life. Neurotic symptoms themselves, when dissected into their component parts, are seen to be composite structures, in a sense a false synthesis of or compromise between conscious, acceptable purposes and those which are intolerable and repressed. The same compromises can be observed in daydreams, in the spontaneous reveries which occur when one is dozing, in induced hypnagogic states, and in nocturnal dreams. In each of these the mental processes start to flow spontaneously and without conscious guidance. So long as they wander in pleasant places, they move without obstruction; but, as we have demonstrated in the work referred to, within a short time the associations converge on storm centers of emotional trouble. When this happens, the day-dream is disrupted, the hypnagogic reverie is broken, or the sleeper wakens, unless sufficient distortion of the dream content occurs to mask the disturbing emotions. This interruption is as inevitable a consequence of the need to protect one's self from psychic pain, as is the tendency to withdraw the hand from a flame. And just as an analgesic drug makes it possible for a patient to allow his hand to be operated on, so a psychically "analgesic" drug, which lowers the intensity of the reaction to such unpleasant emotions as rage, anxiety and guilt, allows

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a patient to explore painful areas of experience without immediate psychic withdrawal at the first warnings of discomfort.

This is one obvious value of the use of drugs as an adjuvant in the exploration of repressed and dissociated psychological experiences. Moreover the fact must not be overlooked that symptom structures and neurotic character traits themselves serve protective functions. Even symptoms which are painful protect from some less tolerable pain; and for that reason patients unwittingly defend their symptoms, just as a patient in the dentist's chair may involuntarily clutch at the dentist's arm. Here again drugs make it possible for the patient to be less assiduous in the defense of his protective symptoms. Thus the psychologically "analgesic" action of drugs assists the process of exploration both by lessening the patient's need to defend his protective symptomatic structures, and by lessening his resistance to exploration itself.

There is still another virtue in certain of the effects of drugs. That which is termed "dissociation" is a complex affair. The word itself is a figure of speech, characterizing a process; but as in the transformation of various forms of energy, we identify this process chiefly through its effects. Sometimes the term is used to indicate that whenever an experience has been repressed, (together with its attendant impulses, frustrations, terrors, and reverberations of psychic pain), the energy attached to it has been channelled via by-paths into some symptomatic disturbance. Sometimes we use it to characterize a more widespread cleavage in the personality as a whole, the most dramatic expression of which is the fully developed multiple personality. On careful scrutiny, however, less conspicuous and less dramatic manifestations of such splittings are observable in many if not all neurotic formations. This indicates that at the moment in which the original repression and dissociation occurs, there may be an alteration in the psychological integrity of the individual, a momentary fragmentation, a loss of complete clarity as to the boundaries of the personality, a moment of doubt: who am I, what am I, where am I, what is happening to me? Inevitably this is a moment of acute psychic pain and perhaps of terror, of psychic chaos to which no human being wants to or even can return at will. Therefore it is a moment which is exceedingly hard for a well-organized personality to recapture. Yet its recovery, in part or in whole, may be essential to the process of therapeutic synthesis. In such cases, the process of hypnosis can be used as one controlled approach to this state of psychic dissolution. Drugs also assist in its recovery; because through their effects on sensori-motor organization, they loosen the tight grip with which patients cling to reality.

Thus drugs can assist both in the lifting of repressions and in the controlled reproduction of the state of Ego disorganization which occurs at the time of the original dissociation, insofar as this may prove to be necessary in psychotherapy. We do not yet know under what conditions this is necessary, nor when therapeutic objectives can be gained without it. This is one of the critical problems for future investigation.

What can now be said with confidence is that the patient's tolerance for interpretations, his ability to find the interpretations emotionally significant and to tolerate these emotions, his ability to incorporate them into his intellectual and emotional process so as to use them in the resynthesis of his psychic functions, can all be enhanced by the proper use of these drugs.

Finally, the use of drugs may further aid the process of reintegration or synthesis, by making it possible to follow sessions of intensive exploration and of affective discharge with an immediate period of sleep. This is not the place for a full discussion of this topic, beyond stating that some observations suggest that highly charged affective and factual information, which has just been secured by penetrating through barriers of repression and dissociation, can be re-united with the rest of the psychic apparatus more easily during sleep than in the fully waking state. If further work should demonstrate the truth of this, certain alterations would be indicated in the organization of psychotherapeutic procedures and practice.

The following generalizations concerning the use of drugs in psychotherapy can be made:

(1) If the drug is not given in such large dosages as to produce profound narcosis, a dynamic relationship with the therapist is continuously maintained.

(2) This relationship influences profoundly both the data produced by the patient and his therapeutic integration of that data.

(3) The drug often makes it possible for the patient to experience on a conscious level and without disguise, those affective attitudes of love and hate towards persons who were significant in his early life, which in his waking state he either disguises, or reverses, or represses completely.

(4) Furthermore, under the influence of the drug, the patient often acts towards the therapist in a manner which makes it transparently clear that for the moment the therapist is identified in the patient's mind with one or more of these objects of his early loves and hates and fears. Thus under drugs the relationship of patient and therapist may contain in overt forms everything which in a veiled form occurs in what is know in psychoanalysis as the transference relationship. A full understanding of the dynamics

of transference processes makes possible the therapeutic utilization of this phenomenon.

(5) Under the influence of the drug, as in the hypnagogic reverie, thoughts automatically pendulate back to storm centers of emotional trouble. Perhaps this is because such storm centers have a higher threshhold for narcosis than do less highly charged areas, just as anoxia can bring to light clinical manifestations of subclinical focal brain damage. This effect of the drug, whereby it subjects non-conflictual areas to mild narcosis, and brings the conflictual foci into high relief, often leads to a more direct recovery of early traumatic experiences than is possible by the circuitous pathways of free association in the fully waking state.

(6) The action of drugs is never a simple function of either the chemistry of the drug or its dosage. The effects of identical doses of any drug administered to the same individual will vary, depending upon the conscious and unconscious emotional processes at work in the patient, and the state of his relationship to the therapist.

(7) The conditions produced by these various agents consist essentially of a controlled delirioid state. Various consequences follow from this, which are of practical and theoretical significance.

(a) Just as organic delirious reactions may unleash latent depressions, elations, and paranoid schizophrenic states which may then endure long after the delirium itself has ceased, the forces which are released under drugs may be of considerable violence, and may have lasting results.

(b) Consequently it is important that such procedures as these should be under close supervision by men who are trained to deal with powerful unconscious forces.

(c) The induction of a prolonged state of saturation with a powerfully active drug introduces into the delirious reaction a toxic organic element which is not easily controlled. This might lead one to question the advisability of using prolonged and profound narcosis, with the idea of working with the released material as the patient emerges. Under these conditions one is no longer able to limit the depth of the narcosis; but must wait for the slow passage of time and the gradual destruction of the drug in the body, or its elimination. It is conceivable that with careful preliminary tests of each patient's reactions to the drug, precise dosages could be established in terms of body mass, basal metabolic rate, and the rate of destruction and excretion. Nevertheless it would seem to be safer to work with temporary drug-effects, where the depth of narcosis can be readily controlled, and where the process can be interrupted quickly at any time, and the after-effects observed repeatedly.

The action of drugs could be discussed further in terms of their relationship to many other psychic phenomena: such as Ego organization, Ego boundaries, reality functions, libidinal pressures, Super-Ego manifestations, the phenomena of hypnosis, etc. Significant though these are, however, a discussion of these aspects of the problem must be reserved for another occasion.

We will now attempt to illustrate a few of the observations on which these general conclusions are based.

I. EXAMPLES OF OVERT MANIFESTATIONS OF TRANSFERENCE RELATIONSHIPS

(1) A man in his early forties, in the course of a fairly lengthy period of analytic treatment, had never been able to feel for his mother anything except mingled intolerance, scorn and impatience, tempered occasionally by indulgence. Under sodium pentothal he began to say in a little boy's voice, "I want my mama, I want my mama, I want my mama." Subsequently in the recovery period, he called the therapist "mama," and treated him as though he were in fact his mother.

(2) A woman in a hypnagogic reverie, induced without drugs, identified one of us with an American Indian who had played an important role in the fantasies of her childhood; and the other of us with her grandfather, who was the storm center of the most violent early experiences of her life.

(3) A young Italian, the youngest of a large family of seven brothers, who for many years had made of him a slave in the family, resisted all forms of treatment. In analysis he could not talk. The attempts of several hypnotists to hypnotize him failed in spite of his urgent and persistent plea for hypnotic treatment. Under nitrous oxide the identification between the therapist and the oppressive parental and fraternal figures was completely exposed, with facilitation of his production of material. After a subsequent period of sleep, a cathartic discharge occurred of the pent-up bitterness and rage with which he had been struggling throughout his life.

(4) A meticulously courteous man in his late thirties was so rigidly formalistic in his relationships as to make it difficult to ascertain any of his real feelings. Internally he dealt with fear, jealousy and rivalry towards all men. Under nitrous oxide he let down his barrier of formality, treated us as though we were his childhood playmates, whose seduction of him was crucial in the evolution of his neurosis. When he was under gas, we became "youse guys" to him.

II. EXAMPLES OF THE AUTOMATIC RETURN TO STORM CENTERS OF EARLY CONFLICT

(1) A man in his middle thirties suffered from severe height phobias and potency difficulties. In a hypnagogic reverie, induced by the apparatus described elsewhere, plus a small amount of one of the cannabis derivatives, he drifted into a reverie state in which he suddenly visualized himself as a small boy standing before his mother's dressing table. To the same degree he could smell the various odors and perfumes of her bedroom, feel the texture of the material, the coldness of the glass, the sensation of her hairbrush, etc. These intense kinaesthetic, tactile, and olfactory memories opened up a vista of forgotten material.

(2) A blocked and inarticulate patient could not put into words anything even remotely related to his difficulties. Under nitrous oxide he found himself repeatedly confronting the image of a locked gate leading to the home where his earliest traumatic experiences had occurred. This locked gate immediately made available a large amount of material concerning members of his family who had locked the gate against him.

III. EXAMPLES OF THE DIRECT RECOVERY OF EARLY MEMORIES

(1) Under sodium pentothal, a young combat engineer recovered a memory of an older man who in his early life used playfully to threaten his genitals with a paperknife. This lost memory became a focus of the fears of genital mutilation which he had carried with him half-consciously into battle and subsequently had "forgotten," and which dominated his combat neurosis.

(2) Through a long and difficult period of analytic treatment a woman in her early fifties had found herself repeatedly visualizing herself standing before a certain small house. She remembered the outside in great detail; but she could not recall anything of the interior. In a hypnagogic reverie, aided by a small amount of one of the cannabis derivatives, the doors and windows of this house opened to her and she recalled vividly the events which had happened to her just after her third birthday. These events were crucial in the evolution of her neurosis.

IV. EXAMPLES OF THE VARIATIONS IN EFFECTIVE DOSAGE

Repeatedly with several patients it has been found that the effective percentage of nitrous oxide in a nitrous oxide-oxygen mixture would vary with the emotional material with which the patient was dealing. This is so well-known that it would be unnecessary to mention it, but for the fact that a patient will sometimes claim that high concentrations of nitrous oxide are ineffective, when in fact he is struggling unwittingly with emotionally charged material. After the discharge of this material, the subject may drift off at once with the same concentration of nitrous oxide, or he may fall asleep with a concentration which had previously been ineffectual.

A striking episode of this kind occurred with sodium pentothal. A young soldier had been discussing his terror and unhappiness in battle experiences. He had reviewed this material several times until he felt much relieved. However, his symptoms were not wholly gone. On a subsequent occasion even larger doses of sodium pentothal failed to put him to sleep. As the injection was proceeding, he became restless, tense, worried and anxious. His hand was cold, blue, and cyanotic. He kept saying, "It isn't going right, Doc. Have you made it up right, Doc. Is there anything wrong with the medicine, Doc. It's making me sick, Doc. I think I am going to vomit. You'd better quit it, Doc. Cut it out, I say. Leave me alone. What the hell's the matter with you?" etc. This was interspersed with descriptions of his difficulties with a commanding officer, and he finally broke out into expressions of anger and resentment against this officer. In order to encourage him in the further discharge of his rage, and without anticipating in any way what was to come, the physician asked him, "What did you want to do to him?" Instead of answering, "Shoot him" which men not infrequently say under these circumstances, he suddenly said with cold, quiet, intense bitterness, "You know, castrate the son of a bitch." The physician was surprised and asked him to repeat it; but there was no reply. On looking up, the physician found that the young man's head had dropped on his shoulder. He was in a sound sleep, and his hand was warm and of normal color.

SUMMARY

In summary, we have pointed out that the processes of repression, dissociation and synthesis, which are the operating concepts in the genesis and therapy of the neuroses, apply equally to the patient under drugs.

Drugs facilitate the recovery of that which has been repressed and dissociated, by rendering the personality less vulnerable to the exposure of material which in the waking state may be intolerable. For the same reasons, interpretations (or syntheses) may be accepted and integrated without catastrophic disturbances.

These facts permit the use of drugs in dynamic psychotherapy to circumvent resistances.

The therapist who is dynamically oriented can con-

trol the therapeutic progress by balancing the adaptive capacity of the patient to the exposed material and to the therapeutic interpretations.

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BILL FOR NATIONAL NEUROPSYCHIATRIC INSTITUTE

Representative J. Percy Priest of Tennessee presented to Congress on March 9 a bill, H.R. 2550, to establish a National Neuropsychiatric Institute under the United States Public Health Service. The general purposes are as follows:

"To provide for, foster, and aid in coordinating research relating to neuropsychiatric disorders; to provide for more effective methods of prevention, diagnosis and treatment of such disorders; to establish the National Neuropsychiatric Institute; and for other purposes."

The Institute is to be administered by a National Advisory Mental Health Council of six members, selected from leading medical or scientific authorities in this field, appointed by the Surgeon General of the Service, who will act as Chairman, ex-officio.

The Bill provides further that the Institute "make grants-in-aid to universities, hospitals, laboratories, and other public or private institutions, and to individuals for such research projects as are recommended by the National Advisory Mental Health Council." Fellowships will be established and both training and facilities for training in other centers will be provided.

A sum of $10,000,000 is to be appropriated for the fiscal year ending June 30, 1946, and thereafter a sum sufficient to carry out the purposes of the Institute. An appropriation of not more than $4,500,000 is to be made for the building and equipment of hospital buildings and facilities and laboratory buildings and facilities, in or near the District of Columbia.

ON THE EFFECTS OF SUGGESTION IN THE TREATMENT OF VASOSPASTIC DISORDERS OF THE EXTREMITIES

MACK LIPKIN, M.D., ELLEN McDEVITT, A.B., M. STEPHEN SCHWARTZ, M.D.,
A. WILBUR DURYEE, M.D.* **

This work was undertaken in an effort to measure the clinical effect of suggestion in certain vascular disorders. New methods of treatment are frequently proposed for vascular disorders in which spasm plays a greater or lesser role—such as thromboangiitis obliterans, arteriosclerosis, Raynaud's syndrome, and scleroderma. Among methods of treatment employed are: hypertonic saline, intermittent venous occlusion, papaverine, mecholyl, histamine, alcohol, sympathetic nerve block, vitamin B fractions, suction pressure, tissue extracts, and estrogenic substances. Many of these have proven to be of definite value. The variability of the results in different clinics suggests the desirability of evaluating the role of psychological factors attendant to all therapeutic measures. This is of particular importance in diseases of the small arteries, since their response to vasomotor impulses is strongly influenced by the psychic state.

Mittelmann and Wolff (6) observed that the skin temperature and the circulation in vasospastic extremities may be markedly altered by emotionally charged stimuli and restored to normal by reassurance. Mufson (7) and deTakats (2) have recently shown that personality difficulties greatly influence the course of Raynaud's disease. The following investigation was undertaken to evaluate the factor of suggestion in influencing the clinical course and symptoms of vasospastic disorders.

METHODS AND OBSERVATIONS

The treatment was described to the patients in terms similar to those used by enthusiastic advocates of particular therapeutic measures. Confidence in the procedure was created by the clinic physician and technician as well as by the physician in charge. By repetition of these views of the staff, the patient was led to expect good results.

After this introduction, the patient was placed in a room averaging about 71 degrees F. Restricting garments were removed and all extremities exposed to room temperature. The patient was allowed to relax for 30 to 60 minutes. A Leeds and Northrup thermocouple was attached to the base of the nail fold of the left index finger. Skin temperature readings were recorded at the nail fold of the 1st, 3rd, and 5th fingers of each hand, each wrist, 1st, 3rd, and 5th toes, the dorsum of each foot, at the ankle, and at each knee. Readings were taken at 10 and 20 minute intervals until constant within 1 degree C. The patient was informed that he would receive a wet treatment and later a dry one. The wet treatment followed the technique used in the Vascular Clinic for mecholyl iontophoresis.

Briefly, the method consisted of wrapping cloths soaked in normal saline solution about the limbs to be treated. A metal electrode was wound firmly around the cloth and held in place with an Ace bandage. Usually, two extremities were treated at a time. Ordinary electrical connections were then attached to the galvanic machine and to the patient's electrodes. We went through all the motions associated with turning on the electric current; sometimes we actually did give saline iontophoresis, but we never used more than 2 milliamperes of current. Treatments were given three times a week—every other day at first. When the current was actually on, the patient always felt some tingling and warmth. Once experienced, these sensations could be reproduced without turning on the current. The patients were then subjected to "dry treatment." It was applied in the same manner, the differences being that the cloths were not dampened and the apparatus never turned on. Their sensations were approximately those they were repeatedly told to expect.

After a variable number of months (1 to 12), intramuscular injections of 1 cc. of isotonic saline solution were given once or three times a week in conjunction with wet or dry treatments or alone. The treatments were given by the clinic technician and nurse. One of us (M. L.) saw the patients once a week, questioned them about symptoms present at the previous interview, and offered reassurance either briefly with casual remarks or with detailed descriptions of the sensations and improvement expected. Periodically patients were seen by one of us (A. W. D.), who observed the capillaries of the nail folds of the same fingers.

Care was taken *not* to inquire into the emotional

* Doctors Irving S. Wright and Harold G. Wolff made helpful suggestions. We wish to thank the Misses Anne Reidy and Betty Elder for technical assistance.

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status of patients to avoid suspicion on their part that psychotherapy was being used, and to avoid the possibility of inadvertent use of more specific psychotherapy. However, patients occasionally commented on their personal problems and remarked on the exacerbation of the vasospastic symptoms during periods of emotional stress. They were given sympathetic hearing but we tried to avoid advising them.

Three patients were treated during this period, sometimes all together, sometimes two at a time, sometimes individually. Reports on these follow:

Case No. 1. A. N.: A 19-year-old girl was first seen in the Vascular Clinic in 1941 complaining of "bumps" on her fingers at the onset of cold weather, for the preceding two years. Her hands had become red, when cold, for many years. During the winter they turned white when immersed in cold water. On examination the hands were cold and moist showing a rubor mixed with cyanosis. There were dark folds of redundant skin over the 2nd, 4th, 5th right and 5th left proximal interphalangeal joints. The oscillometric readings of the upper extremities were slightly diminished. The Allen test showed slightly delayed arterial filling. Capillaries were slightly dilated and tortuous with sluggish blood flow. Her response to a heat pad on the abdomen was somewhat slow; the arteriolar spasm in individual digits was released at different times; it was two hours from the time the skin temperature of the first digit rose until spasm disappeared from the last toe. The Landis test was normal. The diagnosis was vasospastic syndrome.

The patient was an attractive girl, of fair emotional stability, who was cooperative, and moderately appreciative. She realized that emotional disturbances affected her symptoms; for example, on one occasion the coldness of her hands had been precipitated by an argument with a friend.

Treatment with wet or dry bandages three times a week continued with rare interruption for five months, when intramuscular injections of 1 cc. of sterile saline thrice weekly were begun and continued uninterruptedly for one year.

This patient showed several interesting responses. After the first Landis test her hands became very pink and dripped perspiration. Thereafter, the same response was elicited by each dry treatment and continued for one or two days. Within three weeks after starting treatment, her hands seemed completely normal in color to her although they appeared unchanged to us. Within another month the cold moist sensations had disappeared. She believed that her hands were entirely normal at the time treatment was stopped. At that time the objective findings were slight decrease in rubor and increased warmth. There were no changes in the appearance of the capillaries. One year later she reported her hands were better than they had been on her first visit but not as well as during the period of active treatment.

Comment: There was a dramatic reaction of hot pink hands after many of the treatments. The patient was very enthusiastic about the results and was certain that the color and warmth were improved. However, despite these excellent subjective results, the only objective evidence of improvement was that her hands were generally warm to touch.

Case No. 2. M. G.: A married woman, 37 years of age, was admitted to the clinic in March 1935 with a history which included obesity, cystitis, pyelitis, hypertension and various allergies. Just before the development of her Raynaud symptoms she had had a dilatation and curettage, supravaginal hysterectomy, amputation of the cervix for fibroids, appendectomy, and a breast abscess. On admission, her complaints were numbness of the fingers bilaterally, with blanching and aching on exposure to cold water. The capillaries were dilated and the flow sluggish. A diagnosis of Raynaud's syndrome was made.

From 1935 to 1941 she was treated with mecholyl iontophoresis, thyroid, theelin, weight reduction, phenobarbital, and intermittent venous occlusion at different times with little or no benefit. She declined cervical sympathectomy.

Our treatment began March 28, 1941. The patient was very apprehensive. Finger temperatures would fluctuate widely, apparently to such stimuli as another physician entering the room. The patient reported that her hands had perspired for two hours following the first treatment; she described feelings of electricity flowing through her body. After the third treatment she perspired all over her body for three days. While out walking her hands became white in small spots—the first time in years they had not gone white all over. Pain abated. Several times it was noted at the end of the treatment that the vascular supply to the fingers was in spasm. As soon as she left the building, spasm subsided and fingers became warm. She stated that she could feel the current being turned off—felt something "go out of my arm." Her general health was better. In April injections of 1 cc. saline intramuscularly three times a week were started. She perspired for an hour after each treatment and soon stated that saline treatment made the heat stay in and that her stiffness was gone. It was found that saline and dry treatments were equally effective. Treatment was continued summer and winter until June 1942. She considered this the most effective treatment she had ever had; the only drawback being the sensation of generalized warmth after each injection or wet or dry treatment.

Comment: Subjective results were excellent. Objectively, the capillary flow increased, though the morphology remained unchanged. This patient was a suggestible, apprehensive, unstable woman with active menopausal symptoms. At follow-up in February 1943 she reported that the symptoms had returned.

These two cases yielded certain information: (1) They demonstrated that pharmacologically inert treatment (dry bandages) when reinforced by suggestion, is capable of relieving the symptoms of vasospasm throughout the duration of treatment, and in one case (A. N.), for at least a year after treatment ceased. (2) The frequently reported observation that several drugs—especially histamine, papaverine and mecholyl—can cause prolonged vasodilatation lasting many hours,

can be duplicated by the use of suggestion of benefit without mentioning that the hands would become pink, hot, or dripping with perspiration. (3) Mittelmann and Wolff's observation that skin temperature may change rapidly under emotional stimuli was confirmed to the extent that M. G. showed this phenomenon. (5) After suggestion, one patient described improvement in color and configuration of the skin of the hands which was not visible to us, thus leaving some suspicion of the validity of other presumably objective reports by patients on color and temperature changes. (6) Objective changes such as altered capillary blood flow occurred after the use of suggestion. (7) As a result of dry bandages applied to the arms and the suggestion that they would feel warm, these patients reported sensations of heat all over the body, and, on many occasions, generalized perspiration. (8) There was no correlation between the subjective sense of warmth and the actual skin temperature.

Case No. 3. W. S.: This man was admitted to the Vascular Clinic in 1934. A diagnosis of thromboangiitis obliterans was made. Findings included: an enlarged heart, blood pressure of 192/100; oscillometric readings slightly reduced in both legs; skin temperature lowered in the feet; eye grounds were normal at this time, but in January 1935 the retinal vessels showed moderate changes including thickening and pigmentary change. During subsequent years this patient received various forms of therapy including mecholyl iontophoresis, injections of tissue extracts and typhoid vaccine. In 1935 arteriography showed occlusion in one leg at the level of the popliteal artery. Typhoid vaccine therapy was continued until October 1937 when the patient had a coronary thrombosis. During the period of vaccine therapy he reported intermittent improvement. Despite instructions, the patient occasionally smoked. Tissue extract No. 568 and later Depropanex were given until March 1941 with little improvement. A modified Landis test showed organic occlusion still present.

Our treatment began on March 28, 1941. The patient received wet treatment three times a week and after the third treatment showed an increase in claudication time. The ergometer test was stopped upon appearance of substernal pain, not leg pain. On April 11, 1941 he came in with considerable pain which disappeared after a "soothing treatment" with no current. He stated that his legs felt very light "as if he could walk miles." On April 18, 1941, he walked 40 blocks without symptoms but subsequently the symptoms returned. He developed severe and persistent pain and treatment was discontinued on May 23, 1941.

Comment: For a period of a month this patient, with long-standing thromboangiitis obliterans, showed marked subjective and objective (ergometric) improvement. Then all symptoms recurred. This may indicate that the analgesic effect of suggestion is not entirely devoid of danger, since this man might perhaps strain his heart or overuse extremities in which there was badly impaired circulation.

Our other cases were treated in the ordinary clinic room. No skin temperature studies were done and these patients were treated in much more perfunctory fashion. Suggestion was used more mildly, approximating what might be done in any clinic using a favored new method of treatment. As long as the patients were responding well, they were simply asked about their symptoms during the preceding week. When they were apparently not responding promptly to treatment they were reassured about the ultimate benefit to be expected. Treatments were given by the clinic nurse or technician, generally two or three times per week, and in all cases but one, the patients were seen by M. L. only once a week. A description of these cases follows:

Case No. 4. M. C.: This 44-year-old unmarried woman was first seen in the Vascular Clinic on August 19, 1941, complaining of pain in the finger tips of both hands. During the preceding winter, her finger tips had turned white when exposed to cold. Since 1937 her fingers had felt stiff and sluggish. In March 1941 a novocaine block was done with no improvement but an alcohol block two weeks later caused definite improvement, lasting only two weeks. At the time of admission, she was in the menopause. A thyroidectomy had been performed in 1934 following several years of nervousness. She complained of excessive perspiration and loss of weight despite a large appetite. She had smoked 60 cigarettes daily, but for the preceding three months this had been reduced to 3 packs per week. Physical examination failed to show any vascular spasm; the fingers were warm; oscillometry was slightly diminished; the Allen test, blood pressure, pulse rate, blood count, urine, Wassermann, and basal metabolic rate were normal. Capillary microscopy showed a marked tortuosity of the venous loops. Furmethide brought improvement only during the two weeks in which it was given.

Our treatment was begun in February 1942 with the "dry" method, three times a week. By March 11, she reported spasms were occurring about a quarter as often, pain was absent, the numbness unchanged; and there was an increase in work output. At the end of March she was changed to wet treatments three times a week and in about a month reported that her nails were growing and no longer splitting; no numbness and rare spasms. The patient reported herself "sixty percent better." Treatment was stopped from June to November 1942. With the return of cold weather numbness recurred. She received treatment regularly (saline iontophoresis three times weekly) without seeing any of the doctors until April 27, 1943. At that time she stated "the treatment has completely eliminated the spasms I had for two years. In previous winters I wore two pairs of gloves and a muff but the spasm came every day anyway." Her fingers were more flexible. There was no change in the capillaries after treatment.

On follow-up December 9, 1943 and January 6, 1944 she

stated there had been "no spasm this winter." At this time the capillaries were normal in appearance.

Comment: This patient showed objective and subjective response to treatment which for one year consisted entirely of the application of impressive apparatus. No additional verbal suggestion was used, yet response was excellent and sustained throughout the following winter without further treatment. The patient was not aware of any important change in her environmental or emotional life during the period of treatment.

Case No. 5. F. G.: A 34-year-old married woman was admitted to the clinic on January 22, 1942 complaining of coldness and numbness of the feet and of the 2nd, 3rd, and 4th fingers of both hands for a period of four years. A nerve block had been done at Bellevue with little if any relief. She also complained of tightness of her throat when emotionally upset. Physical examination showed varicosities of both legs, normal oscillometric readings, cyanotic and cold extremities; and a normal response to a Landis test and basal metabolic rate. The capillaries were small, spastic, and slightly irregular with slow flow. A diagnosis of Raynaud's syndrome was made.

Treatment was begun on March 13, 1942 with "dry treatment" three times a week applied to the legs. By May, partly because of weather, she was quite well. Treatment was stopped from June to September. Intramuscular injections of 1 cc. of saline thrice weekly were given for two weeks, then dry treatments were substituted. She began to experience great warmth during and after the dry treatments, extending from the toes up to the spine. Within two months she reported much improvement. Spasms were rare, briefer, less intense, and required longer exposure to cold to produce them. There was some slight evidence of improvement in capillary blood flow. During a month of record cold and during a period in which she nursed her father (who was dying of carcinoma of the rectum) in addition to taking care of her home and children, she improved quite steadily, had fewer spasms and was able to say, "as far as spasms are concerned, this winter is 98% better than the winter before."

Comment: It should be noted in this case that when the application of apparatus was not reinforced by direct verbal suggestion this patient's general symptomatic response was meager, unlike M. C. above. When suggestion of benefit was strong, she reported symptomatic improvement even during periods of tremendous physical and emotional strain, as well as during record cold. When conversation was restricted to questions about her symptoms, her reports were generally less favorable.

Case No. 6. E. M.: This was a 65-year-old man with a seven year history of blanching of the four last fingers and toes lasting from one half to one hour on exposure to cold. He smoked four to five cigarettes a day. The oscillometric readings of the lower extremities were within normal range. The remainder of the physical examination and history contributed nothing. The capillaries were 50% of normal size with occasional very dilated ones. The diagnosis was Raynaud's syndrome.

He was given treatment with saline iontophoresis once a week and 1 cc. saline injections twice a week. Despite the long history, within a week the blanching was not as extensive; his hands were warmer between attacks despite very cold weather; cold water no longer caused spasm. Thereafter the procedure was one dry treatment and two injections per week. Two months of treatment produced excellent subjective response. Specifically, he stated that stiffness and slight swelling of the fingers had disappeared; spasms no longer extended to the third joint of the finger but only to the second and they were briefer. The patient was disappointed that a change in his job location necessitated termination of treatment.

Comment: Like the preceding patients, E. M. showed excellent subjective response.

Case No. 7. L. E. A married woman, aged 38 years, was admitted to the clinic on April 16, 1940, complaining of whiteness, coldness, numbness, and tingling of the hands. The oscillometric readings were normal as were the blood count, Wassermann, urine analysis, blood sugar, phosphates, and calcium. The Allen test showed delayed filling time from the ulnar arteries, bilaterally. The capillaries were normal in number with slightly increased tortuosity. A diagnosis of vasospastic syndrome was made.

Treatment by mecholyl iontophoresis, dried thyroid and phenobarbital produced little response.

Suggestion in the form of saline iontophoresis three times a week produced a marked response. Within two weeks she reported that she could put her hands into cold water without spasm. When vascular spasms occurred in cold weather they were less intense, less prolonged, and less extensive. A number of treatments were omitted, but in January, after nine treatments (3 dry, 1 saline, and 4 injections of sodium chloride intramuscularly), the patient reported absence of spasm even though she delayed putting on her gloves or using a muff. The patient lapsed from treatment.

Comment: This patient reported excellent subjective response during a one-month period, but we have been unable to obtain a follow-up.

We now turn to the cases in which results were less favorable.

Case No. 8. A. S.: This 26-year-old woman complained of attacks of blanching of all her fingers, recurrent during the preceding six years. The attacks were precipitated by changes of temperature and occurred more commonly in winter but occasionally in summer. Repeated ulcerations had occurred which were painful but healed slowly and spontaneously. Physical examination showed poor nutrition but nothing else of importance. The past history was irrelevant with the exception of a nephrectomy done in 1940.

Treatment was begun with the saline iontophoresis wet method weekly and intramuscular saline, 1 cc., twice a week. Within two weeks the ulcerated right thumb was no longer sore and seemed to be healing. The pain previously

associated with vascular spasm was no longer present. She could tell when fingers were in spasm only by looking at them. "Nervousness about the injections" had caused a loss of appetite and interfered with her work. Within four weeks the ulcer had healed completely. She no longer minded cold. At this time her nail fold capillaries showed slight dilatation, but rapid and constant flow. Despite cold weather, she considered herself markedly improved and stated that she was completely free of pain. A week later she complained of a marked increase of vascular spasm which now lasted hours and of chilled feeling during a dry treatment in a warm room. The patient reported difficulties with a neighbor who terrified her. The following month another ulcer appeared. Shortly thereafter she lapsed from treatment.

Comment: This patient demonstrates very well the type of case in which cold is less important than psychologic difficulties in precipitating vascular spasm. During one period she developed pain on putting her hands in hot water. Several other observations are of interest. After suggestive treatment the pain which usually accompanied the blanching disappeared for several months. An ulcer of the finger-tip healed promptly, though present for months before treatment. Her capillaries showed less dilatation and increased flow after treatment.

Case No. 9. F. H.: A married negress, 47 years old, was admitted to the Vascular Clinic on November 2, 1939. She complained of attacks of cold hands with bluish discoloration and white spots at the tips of the fingers since December 1938. These attacks occurred summer and winter to the same degree. The oscillometric readings were within normal range and there were slightly diminished pulsations in the upper extremities. A diagnosis of Raynaud's syndrome with sclerodermatous involvement of the hands was made. The capillaries were dilated with sluggish flow.

This patient was treated from April 29, 1942 to May 10, 1943, but her attendance was very erratic. There were periods of apparent improvement after treatment. The trophic ulcers which developed would improve and they occurred less often. There was marked improvement in the capillary flow but not in the scleroderma.

Case No. 10. P. G.: This patient, a 30-year-old married woman, was referred to the Vascular Clinic on June 12, 1941 with a diagnosis of rheumatoid arthritis with vasospastic symptoms. Her symptoms included rubor and cyanosis of the fingers of both hands followed by blanching, on exposure to cold or excitement. She had stopped smoking without change in her fingers. Extensive physical, laboratory and x-ray examinations were done with normal results except that a glucose tolerance test showed a "flat curve." The capillaries showed small spastic loops with a steady flow and no dilated loops. ("Capillaries were not characteristic of Raynaud's disease"—A. W. D.)

The patient was given saline iontophoresis weekly plus intramuscular saline twice a week. During the first month she reported steady improvement. Then came a period of conflicting reports during which the vessels in her hands would go into spasm but the hands would remain warm. The stiffness seemed to improve. At the end of a month she was changed to dry treatment and the improvement continued for about another month. By May, however, she was complaining of increasing pain and stiffness due, apparently, to rheumatoid arthritis. Treatment was discontinued during the summer. In October 1942 she reported that spasm was recurring even when her hands were under cover. She had been nervous and upset because of her child's illness. Then came a period of slight improvement. In January her hands definitely improved subjectively, but her feet became involved. Treatment of the legs caused slight improvement for a period of time.

Comment: This case was one of rheumatoid arthritis with vasospastic symptoms. She reported improvement intermittently but such usually happens in this disease even without treatment. We believe that this patient experienced little or no improvement. There was no noteworthy influence on the rheumatoid arthritis.

DISCUSSION

Our results indicate that suggestion, direct or indirect, can produce in vasospastic disorders a variety of favorable subjective, and to a less extent, objective responses—some of them rather dramatic. It is important to compare the results obtained using various pharmaco-dynamic agents with those resulting from suggestion. Spiegel (9) found improvement in 15 of 21 cases of Raynaud's syndrome treated with either "total vitamine" or with vitamin B complex. In cases of Raynaud's syndrome treated in our Vascular Clinic with mecholyl iontophoresis, this agent "has failed to give satisfactory permanent relief (sufficient) to warrant regular use in this condition" (4). Starr also found no significant therapeutic effect. Wright and Littauer (5) could not demonstrate vasodilating effects of papaverine in 4 subjects with Raynaud's disease. Bernheim and London (6) reported successful treatment of 4 cases of vasospasm of the extremities, perhaps atypical Raynaud's disease, by means of a high calcium, viosterol, orange juice and tomato juice regime. In other words, results obtained with suggestion are comparable, we believe, with those obtained by any reported method of treatment except, perhaps, surgery.

We would emphasize that we are not advocating the use of suggestion as a standard form of therapy in this disease. We are pointing out, however, that suggestion is capable of causing marked diminution of symptoms due to vasospasm. Hence, there would seem no justification for the general use of new therapeutic agents until there is strong evidence of specific effect not obtainable by suggestion alone.

SUMMARY

1. Nine cases of vasospastic disorders were treated with suggestion, applied in various ways. Six of the nine showed excellent subjective and some objective response. Of the other three, one showed definite marked transient improvement including healing of ulcers, but the symptoms recurred; she was a very unstable, neurotic girl who had much psychologic trauma during the period of treatment and demonstrated vascular spasms on immersing her hands in warm water. A second had rheumatoid arthritis, and a third was irregular with treatment and had complicating scleroderma but her capillary flow and symptoms improved markedly during treatment.

2. One case of long-standing thromboangiitis obliterans showed marked transient improvement but soon relapsed.

3. Several observations on the effects of suggestion are recorded:

(a) Relief of vasospasm over a period of several years.

(b) In at least two cases, subjective improvement was present after a year of no treatment.

(c) Prolonged vasodilatation with hands becoming pink and dripping with perspiration for hours after treatment was observed.

(d) Skin temperature may change rapidly under emotionally charged stimuli.

(e) Some patients showed periods of increased symptoms when psychologically traumatized in the home environment.

(f) Cold is sometimes less important than psychic trauma in precipitating acute spasm.

(g) One patient described improvement in color and configuration of the skin which was not apparent to us.

(h) No consistent correlation was observed between actual skin temperature and subjective sense of warmth.

(i) Altered capillary flow occurred after suggestion in several instances.

(j) Although patients generally respond better when verbal suggestion of improvement accompanies the use of apparatus, one patient did remarkably well on the use of the apparatus alone.

These studies emphasize the need for adequate controls in therapeutic studies of vascular disorders in which spasm plays a part.

CONCLUSION

Suggestion in the form of impressive but pharmacologically impotent apparatus with or without additional verbal suggestion of impending therapeutic benefit caused pronounced subjective and slight objective improvement in the majority of cases of vasospastic disorders studied.

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PSYCHOPHYSIOLOGICAL RELATIONS IN CASES WITH HEAD INJURIES

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The nature of late post-traumatic syndromes has intrigued many investigators. Numerous reports have appeared which blamed the occurrence of symptoms, among other things, on the nature of the injury, the brain region affected, the pre-traumatic personality, or the desire for compensation. But few of these studies made use of objective methods and the evaluation was usually biased by the examiner's personal opinion. To obviate these shortcomings, an attempt [1] was made to compare psychological and physiological functions of post-traumatic cases with those of patients suffering from brain disease on the one hand, and from psychoneuroses on the other. It was hoped that such a comparison would reveal which of the post-traumatic features are related to the presence of brain damage and which to psychoneurotic developments.

In search of objective methods which would substantiate the presence of abnormal mental trends, attention was directed to the use of the Minnesota Multiphasic Personality Inventory (8), which in spite of some shortcomings was considered to constitute the best available test for investigation of personality. The intellectual functions were examined by a shortened version of the Wechsler-Bellevue Adult Intelligence Scale. The selection of physiological tests was brought about by several reports stressing the relation between mental phenomena and respiration, especially in the psychoneuroses, Finesinger (3, 4), Kerr *et al.* (9), and Soley and Shock (16). Applied to the post-traumatic syndromes, study of ventilation and regularity of respiratory excursions in relation to the physical symptomatology of the anxiety states and psychoneuroses (3, 4, 9, 16) and study of metabolism in relation to the emotional state in general (2) seemed worth considering. In the study of post-traumatic syndromes, the primarily psychoneurotic conditions could be expected to show increase in ventilation and irregularity of respiratory tracings. Syndromes related to the presence of brain damage were likely to be associated with increased metabolism.

In order to reinforce abnormal respiratory trends existing under basal conditions, the present study was extended to investigation of respiratory functions during work and strain. This procedure was also likely to answer the question whether the frequent complaint of easy fatigability is related to abnormalities of the respiratory functions or not. Hence, all the patients were subjected to a standard task of work, which in a subsequent experiment was complicated by physical strain. The latter was produced by having the subject perform manual work under ischemia of the working arm, which induces rapid fatigue and pain. The amount of work done, muscular tension and changes in heart rate were thus simultaneously recorded together with ventilation and metabolism in cases with brain disease, recent head injuries, chronic head cases, and psychoneuroses. It was hoped that the choice of methods as well as the comparison of various types of patients would contribute to the understanding of the etiology of post-traumatic syndromes.

CASE MATERIAL

The population studied consisted of patients who were either referred by doctors or sought spontaneously the help of the medical profession. More specific details of the sources of referral and the past history of the subjects can be found in an article by Ruesch *et al.* (14). Every case willing to spend three days or more in the hospital was admitted to the Langley Porter Clinic for extensive examination. Thus, only 34 of the 132 patients studied were ambulatory cases.

(1) *Cases With Brain Disease:* The mean age of the 16 patients studied was 40.4, ranging from 15 to 63 years. Ten subjects were males, six females. The diagnostic distribution was as follows: four cases with brain tumors (1 astrocytoma, 2 hemangiomas, 1 ependymoma) verified by operations; three cases with vascular diseases (cerebral arteriosclerosis, thrombosis, meningovascular syphilis), one case of subarachnoid hemorrhage, two cases with post encephalitic Parkinsonism, one case of alcoholic encephalopathy, two cases with senile and presenile dementia, one case with Little's disease, one case with general paresis, one case with convulsive disorder and phenobarbital intoxication.

(2) *Acute Head Injuries:* In subsequent paragraphs "acute" refers to patients who were examined within four weeks of the accident. The mean age of the 29 patients studied was 44.4, ranging from 19 to 71 years. Twenty-six subjects were males, three females.

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[1] The work in this paper was done under a contract recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the University of California Medical School. This study is part of an investigation of the sequelae of head injuries being conducted at the Langley Porter Clinic, San Francisco.

Twenty of the patients had neurological signs after termination of the initial coma; ten had linear or basilar skull fractures. Using the method described by Ruesch *et al.* (14) for the classification of the severity of the injury, 11 of the patients had mild or moderate, 18 had severe or complicated injuries.

(3) *Chronic Head Injuries With Signs of Brain Damage:* In subsequent paragraphs "chronic" refers to patients who were examined three months or later following the accident, except for 3 cases who were seen two months after the injury. The presence of brain damage was determined by neurological and psychiatric examination. Signs such as convulsions, pathological reflexes, inequality of tendon or cutaneous reflexes, cranial nerve palsy, bloody spinal fluid, or disorientation and confusion were taken as evidence for brain damage suffered. The mean age of the 29 patients examined was 37.4, ranging from 22 to 62 years. Twenty-six subjects were males, three females. Six of the twenty-nine patients were estimated to have had mild or moderate injuries, 23 to have had severe or complicated injuries.

(4) *Chronic Head Injuries Without Signs of Brain Damage:* The mean age of the 28 cases studied was 31.0, ranging from 11 to 62 years; 23 subjects were males, 5 were females. Seventeen of the twenty-eight patients were estimated to have had mild or moderate injuries, eleven to have had severe or complicated injuries.

(5) *Psychoneuroses:* The mean age of the 30 cases studied was 32.5, ranging from 18 to 60 years; eighteen subjects were males, twelve females. The patients were selected clinically with regard to their complaints in order to obtain a group of cases comparable to the chronic head injuries. The actual selection was based on the presence of high scores in the neurotic scales of the Minnesota Multiphasic Personality Inventory. Thus, patients with hypochondriasis, hysteria and depression constituted the majority of the cases, in addition to two cases with mucous colitis, one with atopic dermatitis, and two cases with periodical excessive alcoholic consumption who all scored high in the personality inventory.

(6) *Normal Control Subjects:* In order to have an estimate of the range of normal performance in the tests of weight lifting and muscular tension, 15 subjects composed of hospital attendants and medical students were studied. Their mean age was 25.7, ranging from 18 to 35 years of age. Ten subjects were females, five were males.

In the measurement of muscular relaxation and weight lifting, the number of cases in each group was slightly different, as shown in Table 1 and fig. 3.

METHODS AND PROCEDURE

1. *Psychological Functions:*

a. *The intelligence quotient* was determined by a shortened form of the Wechsler-Bellevue Adult Intelligence Scale, comprising four instead of the customary ten test items. Vocabulary, Similarities, Block Design, and Digit Symbol were selected because of their high correlation with the full scale scores obtained with all subtests. The examination time was thus shortened considerably without sacrificing the validity of the procedure.

b. *Abnormal personality trends* were determined by means of the Minnesota Multiphasic Personality Inventory (8). The Inventory consists of 550 items describing physical symptoms, mood, activity, attitudes, interests and other personality aspects. The subject is requested to sort these items according to "true," "false," or "cannot say." The test was originally validated against a series of normals and patients with various psychiatric diagnoses. In the present study the test was shortened to about 300 cards by including only those items contained in the scales labeled Hypochondriasis, Hysteria, Depression, Psychopathic Deviate, Psychasthenia, Paranoia, and Schizophrenia. Since the test results are expressed in terms of T scores, they can be combined in several ways. For our purposes it was desired to contrast neurotic tendencies with other abnormal trends; the scores were thus combined as follows:

Neurotic Score: sum of hypochondriasis, hysteria and depression scales.

Psychopathic Score: as measured by the psychopathic deviate scale.

Psychotic Score: sum of psychasthenia, paranoia and schizophrenia scales.

By computing the difference between Neurotic and Psychotic Scores, one obtains an index of the prevalence of neurotic or psychotic processes. Positive values indicate neuroses, negative figures psychoses, and values around zero show that the personality is either normal or diffusely affected by different psychopathological processes.[2]

2. *Respiratory Functions:*

Respiratory data for this study were obtained by means of a closed circuit McKesson metabolism apparatus. The respiratory records were analyzed as follows: The respiratory rate was counted directly and the mean of a 6 minute tracing was taken as representative value. The ventilation volume was obtained by measuring the vertical distance between each trough and the successive peak and by converting the values into volume of gas expressed in cubic centimeters and liters. The tidal air for each case was obtained

[2] Miss R. Gilman and Mrs. M. H. Coonley have given valuable assistance in obtaining respirograms and electromyograms in the course of this investigation. Acknowledgement is due to Mrs. R. Hood for administration of the psychological tests.

by dividing the minute volume by the minute ventilation rate. Oxygen consumption, heat production and metabolic rate (Aub-DuBois Standards) were calculated by reducing all gas volumes to standard conditions of 0° C. and 760 mm. mercury, and by relating them to the body surface area which was calculated from height and weight of the subject.

The respiratory score represents a measure of regularity of breathing in which low figures show regularity, high figures irregularity of respiratory excursions. It was obtained as follows: Two lines were drawn so as to touch the greatest number of points at the top and bottom of a 6 minute spirogram. These lines were referred to as the upper and lower lines of reference. Any trough or peak exceeding or falling short of these reference lines was called by definition irregular. For each of these irregularities one point was assigned, and for each sigh exceeding twice the distance between the reference lines, a score of 10 points was added. The sum of these penalties for the 6 minute tracing divided by 6 was called the "respiratory score." If the two reference lines are not parallel, the value for "$\frac{1}{3}$ of the distance" varies at different places of the tracing. This procedure is simpler and quicker than the one described by Finesinger (4), and has, in addition, the advantage of being defined in relative terms so that it can be used on all metabolic machines. It correlates $+.66 \pm .055$ with the "spirogram score" of Finesinger (4).

3. *Circulatory Functions:*

The heart rate during breathing experiments and work was determined by means of continuous electrocardiographic recording. Flat solder disks, 6-10 mm. in diameter and attached to insulated wire, were fastened to the skin by means of collodion. One disk was placed on the left mastoid, another one on the left knee cap. This localization insured the recording of the cardiac action potentials with a minimum of disturbing skeletal muscle potentials. Two such electrodes constituted a bipolar lead which was connected to a Grass electroencephalographic set of amplifiers built in 1942. The recording unit was a six channel ink writing oscillograph capable of following frequencies up to 120 cycles per second. The same amplification was used in all the experiments in order to obtain comparable records.

4. *Motor Functions:*

Two aspects of motor functions were studied: The amount of work done during strain and the general effort involved while doing the work. The amount of work done was measured by the number of times a standard weight of 1250 gm. could be lifted over a standard height of 145 mm. In order to obtain an index of the degree of tension and relaxation present in between the periods of actual weight lifting, the method described by Ruesch and Finesinger (11) was used. Electromyograms were obtained from the flexor and extensor surfaces of the working forearm by means of skin electrodes, and amplification and recording were done as described above. The sections of the record between the bursts of action potentials (corresponding to the work of the hand) were measured and expressed in percent of the total length of the record. The value so obtained was called "relaxation index."

ACTUAL PROCEDURE

1. *Testing Under Basal Conditions:* All the subjects studied had been kept in a fasting state since the evening meal of the previous day. The 98 hospitalized patients were brought by guerney to the metabolism laboratory where they rested for an additional 30 minutes in a semi-dark room. The 34 ambulatory patients rested for at least 45-60 minutes before the first test was taken. The subjects were then connected with the metabolism apparatus which was filled with oxygen, a mouth piece and a nose clip being used as in routine metabolism tests. For the large majority of the subjects it was the first experience with the metabolism apparatus. In the first six minute run a routine test for oxygen leakage was made. The second six minutes were then taken as the actual test reading.

2. *Testing During Work:* For the second phase of the experiment, the subject was seated in an armchair with a supporting board for the forearm. The arm of the patient was strapped to the board so that motion was possible only in the wrist joint. The weight reposed on the floor and was attached by means of adjustable ropes to a handle which was placed in the subject's palm. An iron bar prevented the subject from lifting the weight any higher than the prescribed distance. He was instructed to lift the weight according to the rhythm of a metronome, and to relax as much as possible in between movements which were done at intervals of three seconds. With this experimental set-up, respiratory tracings, electromyograms of the right arm, and recording of the heart rate were obtained simultaneously (see fig. 1).

3. *Testing During Strain:* After 12 minutes, the experiment was complicated by placing a blood pressure cuff around the upper arm of the working hand, and inflating it to 200 mm. mercury. The subject was instructed to go on with his work as long as he was able to do so. For determination of the heart rate during strain, the period of from 40-[illegible] seconds before release of the cuff (indicated by the patient's inability to continue), was taken and the heart rate counted. For determination of the heart rate during recovery, the period from 20-40 seconds following the release of the blood pressure cuff was counted. Minute volume and respiratory score for the strain period were obviously not derived from a full six minute tracing, but from a shorter record varying with the frequency of weight lifting. The latter number ranged in general from 20-60, corresponding to a period of 1-3 minutes.

STATISTICS

The results have been presented in terms of means (M) with corresponding standard deviations (SD). Differences between means have been described as significant if the difference divided by the probable error (PE) of the difference equalled or exceeded 4.0. Correlations have been determined by the product-moment method (Pearson's r). Following customary use, coefficients ranging from 5 to 6

times the PEr have been considered as indicating a slight correlation, and from 7 times and above as indicating a marked correlation.

RESULTS

1. *Psychological Functions:*

Mean values and standard deviations for all the groups of patients studied are given in Table 1. Comparing the intelligence quotients and neurotic scores of the various groups of patients, it becomes obvious that the chronic head injuries fall in between the psychoneuroses on the one hand, and the acute patients and cases with brain disease on the other. It is worth noting that mean intelligence quotient, as well as mean neurotic and psychotic scores, increase as objective signs of head injury disappear: Thus acute cases have the lowest, chronic cases without neurological signs the highest values, and chronic cases with signs fall somewhere in between (fig. 2). This sequence suggests that there exists, to a certain extent, a mutually exclusive antagonism between presence of brain damage and psychoneurotic development. Intelligence seems to be a requisite for the presence of high neurotic scores. An interesting difference exists between personality disturbance in cases with brain disease on the one hand, and chronic head injuries and psychoneuroses on the other, the former score high in both neurotic and psychotic aspects, the latter group in neurotic features only. This difference demonstrates clearly that late post-traumatic syndromes psychologically resemble the psychoneuroses more than the cases with brain disease.

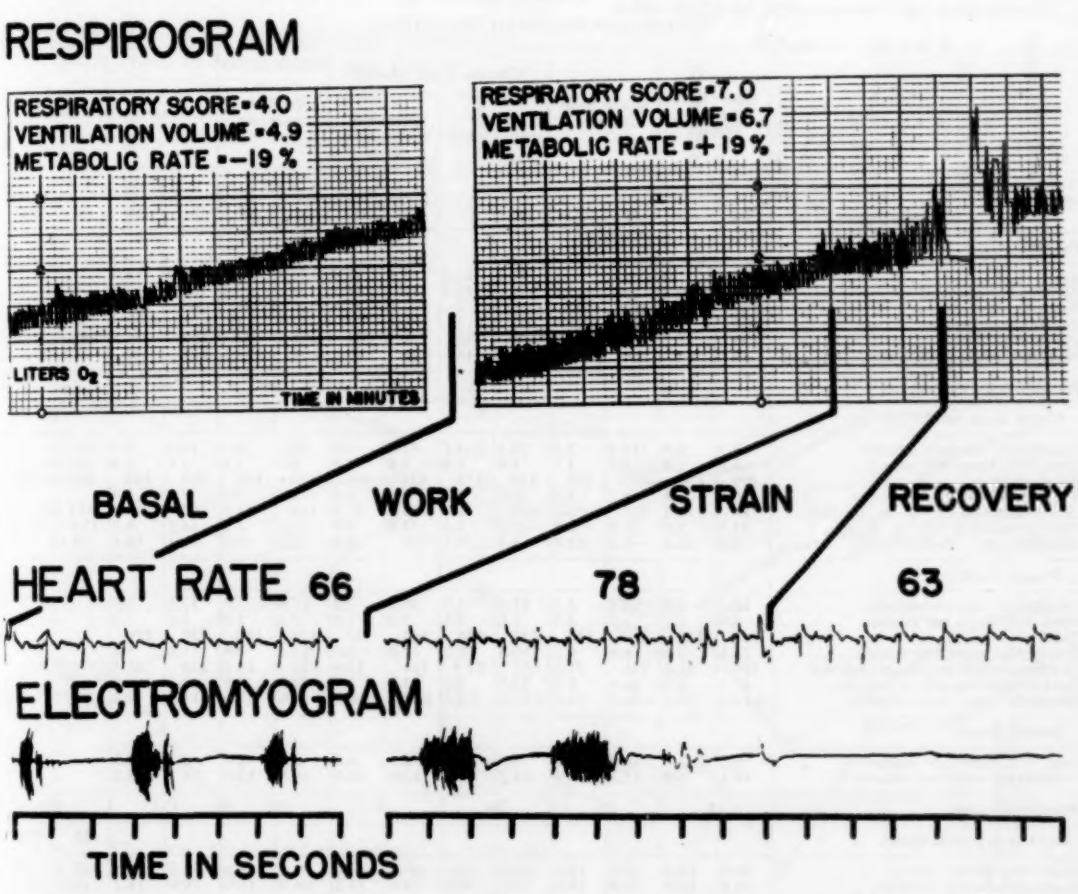

FIG. 1. This record was obtained from a 23 year old male suffering from post-traumatic epilepsy. The respiratory record shows the moderate increase in respiratory score and ventilation volume and the marked rise in metabolic rate during work, characteristic for the group of chronic head injuries with neurological signs. Note the sub-average increase in heart rate during strain and the immediate slowing after release of the blood pressure cuff, which is accompanied by irregularity of breathing.

2. *Respiratory Functions:*

Mean values and standard deviations for the various groups of patients studied are reproduced in Table 1. Comparison of our values for basal conditions with the norms given by Soley and Shock (16) for similar age and sex groups, and computed in the same geographical locality, reveals that the majority of these values fall within the limits given by these authors. Our larger values for ventilation volume and tidal air may constitute either true differences or may be due to differences in methods used. Since Thompson and Corwin (17) mention in their review higher values, one must assume that the findings of the present study fall essentially into customarily obtained ranges. Tidal air under basal conditions and respiratory score during work and strain increased in the three groups of head injuries studied, as objective signs of brain damage disappear. Acute cases have the lowest values, chronic cases without neurological signs the highest, while the chronic cases with signs fall somewhere in between. This increase is paralleled by an increase in mean intelligence quotient and neurotic score (fig. 2). It is worth noting that the groups with the highest ventilation volume under basal conditions (psychoneuroses) show the smallest increase when put to work. Those with the smallest basal ventilation volume show the greatest increase. Under both basal and work conditions, a slight trend toward higher metabolic rates can be noted in the acute cases and in patients with brain disease, as opposed to the values obtained from patients without neurological signs or with psychoneuroses (fig. 3). Presence of brain dam-

TABLE 1

MEANS AND STANDARD DEVIATIONS

	Cases with brain disease		Acute head injuries		Chronic head injuries: With neurological signs		Chronic head injuries: Without neurological signs		Psychoneuroses		All cases		Norms	
Number of cases	16		29		29		28		30		132			
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
PSYCHOLOGICAL FUNCTIONS														
Age	40.4	17.9	44.4	13.6	37.4	11.4	31.0	15.4	32.5	11.6	36.9	14.6		
Intelligence quotient	93.3	10.2	99.3	17.6	102	13.4	110	11.1	113	12.1	105	14.9		
Neurotic score	197	24	170	33	206	25	207	32	221	30	203	34	150	30[a]
Psychopathic score	60	9	60	12	60	13	60	14	62	11	61	13	50	10
Psychotic score	198	37	164	31	170	35	179	34	186	37	177	36.1	150	30[b]
Neurotic minus psychotic score	−1	44	+6	45	+36	43	+28	46	+35	47	+26	48		
RESPIRATORY FUNCTIONS														
Under basal conditions													M[c]	
Ventilation rate per minute	14.5	4.4	14.4	2.5	13.7	3.7	13.8	3.9	13.7	4.0	14.0	3.7	13.7 to 14.7	
Vent. Vol. liters per minute	5.6	2.3	5.3	1.7	5.8	1.9	5.8	2.3	6.2	2.6	5.9	2.4	4.5 to 5.3	
Tidal air in cc.	409	136	375	107	424	175	434	166	470	198	423	164	319 to 390	
Respiration score per minute	6.6	3.3	6.2	4.5	6.5	4.5	9.1	5.8	7.4	4.9	7.0	4.9		
O_2 consumption cc./sq. m./minute	119	14.4	128	18.3	127	11.7	125	17.1	119	11.1	123	15.4	112 to 125	
Heat production cal./sq. m./hr.	34.7	3.8	35.5	5.8	35.2	2.6	35.8	4.0	34.4	3.7	35.1	4.2	32.6 to 36.6	
Metabolic rate (Aub-Dubois)	−9.3	13.3	−7.1	12.8	−9.4	9.1	−12	6.3	−10.2	10.4	−9.4	10.4	−9 to −17	
During work														
Ventilation rate per minute	18.1	3.1	18.4	2.1	17.4	3.0	16.5	2.3	17.6	3.7	17.5	3.0		
Vent. Vol. liters per minute	8.0	2.7	7.7	2.4	7.6	2.1	7.2	2.3	7.4	1.9	7.5	2.3		
Tidal air in cc.	442	189	420	147	455	148	444	142	429	150	439	170		
Respiration score per minute	12.5	5.5	8.8	6.7	10.6	6.5	12.4	4.9	13.3	4.6	11.4	5.2		
O_2 consumption cc./sq. m./minute	156	21.4	156	31.1	151	17.0	151	17.6	155	19.2	153	21.5		
Heat production cal./sq. m./hr.	45.3	6.2	44.8	8.5	43.7	5.6	43.0	4.9	44.2	5.9	43.7	7.6		
Metabolic rate (Aub-Dubois)	+19.6	20.1	+16.8	22.3	+12.8	14.8	+12.1	10.8	+15.8	17.6	+14.9	17.2		
During strain														
Vent. Vol. liters per minute	9.1	2.3	10.4	4.1	9.9	2.4	9.1	3.3	9.0	2.4	9.3	2.6		
Respiratory score per minute	15.1	7.9	11.1	10.9	12.2	9.1	17.9	13.0	20.8	15.0	16.7	12.3		
Number of cases	15		23		30		38		27		133		15[d]	
CIRCULATORY FUNCTIONS													M	SD
Heart rate during strain	95.8	15.0	87.7	12.7	85.4	12.1	86.9	14.4	96.0	8.9	89.5	13.4	102.4	20.7
Heart rate during recovery	84.8	16.9	79.8	12.1	75.6	9.8	74.6	11.1	86.0	18.0	79.0	14.2	79.6	17.2
MOTOR FUNCTIONS														
Per cent of relaxation at work	19.7	15.1	22.1	21.5	27.3	21.8	27.4	19.4	31.8	19.3	25.9	20.2	34.1	20.7
Frequency of weight lifting	33.3	17.5	38.3	13.9	35.3	17.1	35.8	15.9	25.7	10.7	34.1	15.9	47.8	14.9

[a] Represents the sum of the Hypochondriasis, Hysteria, and Depression scales of the Minnesota Multiphasic Personality Inventory.
[b] Represents the sum of the Psychasthenia, Paranoia, and Shizophrenia scales of the Minnesota Multiphasic Personality Inventory.
[c] These are the mean values as given by Soley and Shock for males and females aged 18–43 years.
[d] Values obtained in 15 normal control subjects.

age seems, therefore, to be associated with a slight increase in metabolism.

3. *Circulatory Functions:*

Table 1 demonstrates that cases with either brain disease or psychoneuroses have a higher heart rate during strain than any of the head injury groups (fig. 3). This relationship persists for the recovery

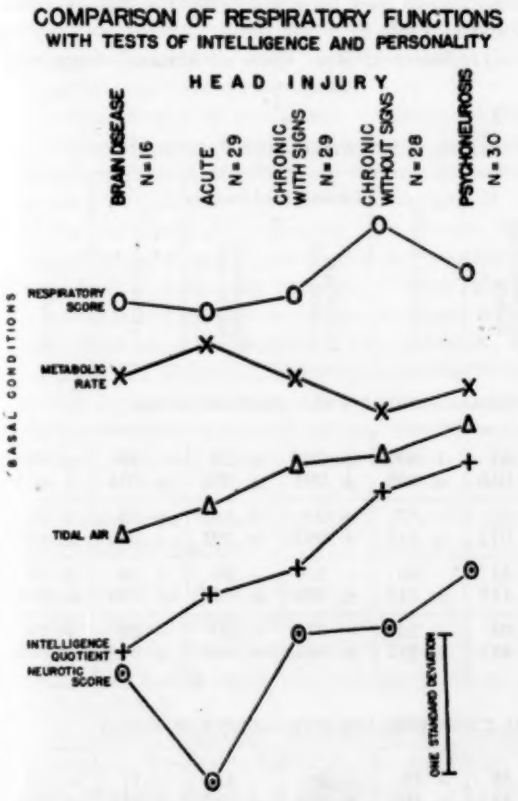

FIG. 2. The mean values have been plotted in terms of standard deviations of the whole group of 132 cases. Note the increase of respiratory score and tidal air, with increase of intelligence quotient and neurotic score in the three groups of head injuries. Metabolism follows an opposite trend, and seems to be directly reversed to the progression of the respiratory score.

period since all the groups of patients show about an equal decline of from 8-12 beats per minute. The normal controls differ from the other patients in so far as the mean heart rate during strain exceeds all other groups with 102.4 beats. The subsequent decline is, with 22.7 beats per minute, about twice as large as for the other groups. These findings are consistent with previous reports by Ruesch and Bowman (13) that head injury cases do not show a sufficient increase in heart rate after injection of adrenalin. Since the increase in blood pressure during ischemia of one extremity was shown to be of reflex nature (1), it is safe to assume that the increase in heart rate is of similar origin (5). It, therefore, appears likely that the deficient rise in the present experiment is also due to some deviant autonomic reflex mechanism.

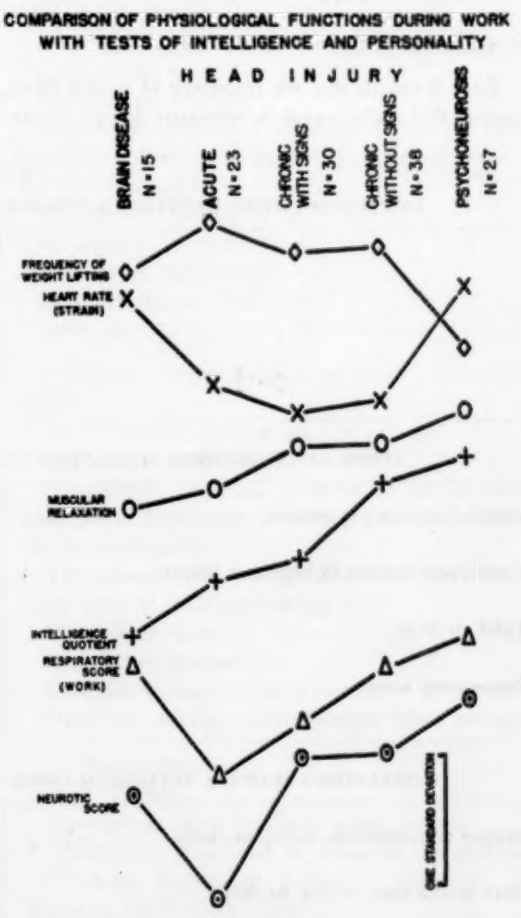

FIG. 3. The mean values have been plotted in terms of standard deviations of the whole group of 132 cases. Note the parallel trends of muscular relaxation and intelligence, of respiratory score and neurotic score in the three groups of head cases. The curve representing the frequency of weight lifting indicates the poor endurance of the psychoneuroses. The heart rate shows the insufficient rise during strain for the three head injury groups.

In order to examine the circulatory functions with another method, we subjected all patients to the "two step test" as described by Master (11). The chronic head injuries performed like the normal controls, and the pulse returned to normal in an average of 82 seconds in the former, and 80 seconds in the latter

group. In contrast, the acute head injuries who were examined before discharge from the hospital needed an average of 145 seconds. Though the few days of sedentary life during hospitalization may have contributed to this delayed return of the heart beat to normal, it is at the same time a demonstration that after head trauma the central regulation of the circulatory system is disturbed.

4. *Motor Functions:*

Table 1 reveals that the frequency of weight lifting during the strain period is obviously lowest for the psychoneurotic group and highest for the normal control subjects. The other groups fall in between. It thus becomes obvious that endurance of pain and fatigue (lifting weight during ischemia) is most impaired in the psychoneuroses.

The poorest muscular relaxation between liftings of the weight, is found in the group with brain disease (fig. 3). The best degree of relaxation for all the patients was found in the psychoneuroses, the value of which, however, was still considerably below the figure for the normal control subjects. Our acute series resemble, with regard to relaxation, the cases with brain disease, while the chronic head injuries approximate the performance of the psychoneuroses. These findings are consistent with previous studies by Ruesch and Finesinger (12).

5. *Intercorrelation of Psychological With Physiological Functions:*

The principal relationship between the various functions studied have been summarized in figures 2 and 3 and in Table 2.

a. *Influence of Age:* Cross correlations of age with psychological and physiological functions studied yield only insignificant results. This would indicate that age is not a significant factor in any of the functions studied. The mean ages for the various groups of patients are, however, different: cases with brain disease and acute head injuries are the oldest, head injuries without signs and psychoneuroses the youngest. This difference is probably an expression of the predilection age at which these various conditions occur.

b. *Association With Neurotic Score:* Cases with brain disease show substantial association between the

TABLE 2

INTERCORRELATIONS BETWEEN RESPIRATORY FUNCTIONS, INTELLIGENCE AND PERSONALITY

	Cases with brain disease	Acute head injuries	Chronic head injuries		Psychoneuroses	All cases
			With neurological signs	Without neurological signs		
CORRELATIONS BETWEEN VENTILATION UNDER BASAL CONDITIONS AND NEUROTIC SCORE						
Ventilation rate per minute	−.81 ±.058	+.39 ±.098	+.20 ±.094	+.24 ±.096	−.29 ±.094	−.01 ±.056
Ventilation volume in liters per minute	+.75 ±.072	+.12 ±.113	+.23 ±.092	+.05 ±.101	+.23 ±.096	+.29 ±.059
Tidal air in cc	+.51 ±.119	.00 ±.114	−.13 ±.096	+.04 ±.010	+.28 ±.093	+.19 ±.062
Respiratory score	−.03 ±.152	−.16 ±.112	−.31 ±.088	−.20 ±.098	+.48 ±.078	+.17 ±.062
CORRELATIONS BETWEEN METABOLISM UNDER BASAL CONDITIONS AND INTELLIGENCE QUOTIENT						
Oxygen consumption, cc/sq. m./hour	+.30 ±.125	−.05 ±.097	−.05 ±.098	−.43 ±.082	−.77 ±.044	−.22 ±.047
Heat production, cal/sq. m./hour	+.16 ±.135	+.09 ±.096	−.24 ±.093	−.68 ±.054	−.79 ±.070	−.20 ±.047
Metabolic rate (Aub and DuBois Standards)	−.05 ±.140	.00 ±.098	−.01 ±.098	−.84 ±.031	−.49 ±.076	−.22 ±.047

functions of ventilation and neurotic score, while the psychoneuroses demonstrate the correlation between irregularity of breathing and neurotic tendencies (Table 2). Since in all three groups of head injuries the correlations are negligible, one might conclude that post-traumatic syndromes represent a combination of neurotic and organic features, as far as basal ventilation is concerned. A coefficient of $+.29 \pm .059$ between ventilation volume and neurotic score for all the cases demonstrates the general tendency of individuals with neurotic trends to have a high basal ventilation volume. Work seems to obscure the relationships discussed for basal conditions, since almost all correlations become insignificant.

c. *Association With Intelligence:* Inspection of Table 2 reveals that the correlations between intelligence quotient and metabolic functions become increasingly negative and substantial from left to right of the tabulation. Since psychoneuroses and chronic head injuries without neurological signs are considerably more intelligent than the other groups (see Table 1), it would follow that above average intelligent subjects have a low oxygen consumption, heat production, and metabolic rate in comparison with patients with average or sub-average intelligence. Work seems to obscure the relationships established for basal conditions since all the correlations become less substantial.

6. *Characteristic Features of the Various Groups of Patients Studied:*

a. *Cases With Brain Disease:*

Age: usually middle aged or older.

Intelligence: Intelligence quotient below estimated premorbid intelligence level; and lowest of all the groups studied.

Personality: Expressed in terms of the Minnesota Multiphasic Personality Inventory, the changes are diffuse, affect the majority of the scales.

Ventilation: Greatest increase of all the groups studied between basal and work ventilation volume.

Metabolism: Increased under basal and work conditions.

Endurance: Sub-average.

Muscular tension: Highest of all the groups studied.

Heart beat during strain: Average increase.

b. *Cases With Acute Head Injuries:*

Age: Usually middle aged or older; oldest of all the groups studied.

Intelligence: Intelligence quotient below average.

Personality: Expressed in terms of the Minnesota Multiphasic Personality Inventory, the only abnormal score is that on the Depression scale. Otherwise lowest Neurotic and Psychotic score of all the groups studied.

Ventilation: Lowest basal volume of all the groups studied, large increase between basal and work respiratory volume, greatest regularity in spirograms under basal and work conditions.

Metabolism: The highest basal metabolism rate of all the groups studied.

Endurance: Average.

Muscular tension: High.

Heart rate during strain: Increase below average.

c. *Chronic Head Injuries With Neurological Signs:*

Age: Middle aged.

Intelligence: Average.

Personality: Expressed in terms of the Minnesota Multiphasic Personality Inventory, increased score on the Neurotic scales.

Ventilation: Average or above average.

Metabolism: Average.

Endurance: Sub-average.

Muscular tension: Increased.

Heart rate during strain: Increase below average.

d. *Chronic Head Injuries Without Neurological Signs:*

Age: Youngest group of all.

Intelligence: Bright normal.

Personality: Expressed in terms of the Minnesota Multiphasic Personality Inventory, increased score on the Neurotic scales.

Ventilation: Above average basal ventilation volume, irregularity of breathing during work.

Metabolism: Low.

Endurance: Sub-average.

Muscular tension: Slightly increased.

Heart rate during strain: Increase below average.

e. *Psychoneuroses:*

Age: Young.

Intelligence: Most intelligent group studied.

Personality: Expressed in terms of the Minnesota Multiphasic Personality Inventory, extremely high scores on the Neurotic scales.

Ventilation: Basal volume and tidal air largest of all groups. Marked irregularity of spirograms during work.

Metabolism: Average or low.

Endurance: Lowest of all groups.

Muscular tension: Increased, but smallest of all groups of patients.

Heart rate during strain: Average increase.

DISCUSSION

The present study compares psychological and physiological aspects of five groups of cases in order to determine similarities and differences of post-traumatic

conditions with psychoneuroses and brain disease. In the planning of this study, choice of two methodologically different procedures was available:

1. Study of unknown functions in groups of patients matched as to age, sex, intelligence, economic status and other aspects. This procedure has the advantage of controlling said factors, but introduces at the same time other distortions: Since each disease is associated with predilection for certain ages, sexes, or intelligence levels, the matching of these factors would ultimately lead to comparison of atypical cases of one group with atypical cases of another group.

2. Study of unknown functions in unmatched groups of patients. This procedure has the disadvantage of not controlling factors such as age and sex, but has the great advantage of assuring a comparison of all the characteristic features of one group of cases with the characteristic aspects of the other group. In the last analysis the medical profession has always to deal concretely with the natural selection of patients who come to seek medical advice, in office or hospital, and criteria derived from research studies have to be applied to this type of subjects. The problem of obtaining representative samples of the populations under investigation is difficult to solve in most medical studies. Concentration on "classical" cases amounts to a study of the extreme percentiles of the distribution, and conclusions made are often valid in that range of the scale only. In this study, therefore, it seemed preferable to avoid any arbitrary selection of cases, and to accept for study subjects who spontaneously sought medical help with regard to symptoms referable to head trauma. The control groups were selected on the basis of presence of brain damage on the one hand, and neurotic scores in the Inventory on the other.

Comparison of the results obtained from the different groups of patients warrant the conclusion that late post-traumatic syndromes without signs of persistent brain damage resemble in many respects the psychoneuroses with depressive, hypochondriacal and hysterical features. Scores on the Personality Inventory, intelligence quotient, ventilation, regularity of breathing, metabolism, and correlations between intelligence quotient and metabolism are much alike in both groups of cases. The psychoneuroses, however, score in many respects, more abnormally than the head injuries without signs of brain damage. This is understandable considering the fact that the large majority of psychoneuroses develop their symptoms without precipitating factors from the environment. In the chronic head injury cases, however, the neurotic character needs the precipitating cause of the trauma in order to lead to disability and physical symptom formation. Chronic head injuries with neurological signs have much less resemblance to the psychoneuroses, and acute head injuries seem in many respects to be closest to the normal population. All head injury groups have one factor in common, which is the insufficient rise in heart rate during strain. This fact differentiates these cases clearly from the other groups, and supports the theory that post-traumatic conditions represent a complex syndrome which is determined by the pre-traumatic personality (13) and the traumatic dulling and slowing of autonomic functions (12). Cases with brain disease differ from head injuries and from the psychoneuroses: their personality change is more diffuse, their intelligence is low and their muscular tension and metabolism are high. The frequently met complaint of fatigue could not be substantiated in the cases with head injuries; neither is the endurance lowered, nor is the metabolism increased during work. The psychoneuroses, however, show their inadequate ability to endure by their readiness to give up under strain.

The well established association between neurotic tendencies and increased basal ventilation volume is difficult to explain. It is possible that breathing into a mouth piece or mechanical resistance of ventilation encountered during metabolic tests disturbs neurotic individuals more than others. But it is also likely that certain cases with psychoneuroses and anxiety may have a permanently increased basal ventilation volume. It is of interest that the groups with the lowest basal ventilation volume have the highest volume during work and vice versa. Thus, work produces only a moderate increase of ventilation in the psychoneuroses, but their breathing becomes markedly irregular as evidenced by the high respiratory score. These findings are fundamentally in agreement with the observations of Finesinger (3, 4) who reports that anxiety states have a greater tidal air and ventilation volume when unpleasant ideas are suggested, and that the spirogram of patients with anxiety conditions is more irregular than that of other patients. In spite of the fact that the present study did not deal with anxiety neuroses, some of the facts established for this latter group of patients can be applied with restrictions to all the psychoneuroses. Anxiety neuroses differ from depressive, hypochondriacal and hysterical reactions primarily with regard to their manifest anxiety, and in mixed cases it is impossible to separate the different features. Since it has been established that the respiratory functions constitute the best available objective measure of anxiety, it would follow that moderate abnormalities of ventilation are a sign of presence of anxiety. Summarizing the results of the present study in the light of other investigations, one can conclude that psychoneuroses are characterized by

instability of ventilation. The latter is expressed in terms of an increased basal ventilation volume and irregularity of the respiratory excursions, both under basal conditions and during work. In view of Finesinger's (3) experiments with unpleasant ideas, one might conclude that the suggestibility, imaginative phantasy and intelligence of the psychoneuroses are, at least in part, responsible for this instability of ventilation. This conclusion is supported by the fact that the dull and unimaginative patients with brain damage show a much greater stability of ventilation.

The relationship between intense emotions and metabolism have been reviewed by several authors (2, 6, 7, 15, 17). Though there is general agreement that intense emotions increase the metabolism, there have been a number of exceptions to this rule. In the present study it has been shown that muscular tension is related to the presence of brain damage, and that both these factors are related to slightly increased metabolism, under basal conditions and during work. It has further been shown that intelligent subjects have a relatively low metabolism during basal conditions and during work, in spite of the fact that these same persons are highly neurotic individuals. Since psychoneuroses are usually associated with emotionality, one would expect a significant correlation between neurotic score and metabolism. The obvious lack of association, however, might indicate that strong emotions as such do not directly alter metabolism, but that collateral phenomena such as muscular tension or vasoconstriction and dilatation, which in turn are functions of intelligence and phantasy, determine metabolism. There is enough evidence to show that individuals vary greatly in their expression of emotions. The choice of somatic symptoms varies from vasoconstriction to dilatation, and from muscular tension to flaccid paralysis, conditions which may have opposite effects on metabolism. The correlation obtained in our cases between low intelligence quotient and metabolism deserves special comment. The I.Q. in these cases is not so much an expression of basic abilities as it is a measure of the residual intellectual efficiency which remains after brain lesions have destroyed some of the abilities present before the disease. This view is supported by the low correlations between intelligence and BMR reported in normal adolescents and adults (15). While it seems definitely established that significant relationships exist between metabolism and emotions, and between metabolism and brain disease, it would appear that further studies are required in which not only the physical basis of emotions should be more fully specified, but also the psychological factors should be more adequately controlled.

SUMMARY

1. Respiratory functions under basal conditions and during work, muscular tension and heart rate during endurance to pain and fatigue have been correlated with tests of intelligence and personality in five groups of patients. These consisted of 16 cases with brain disease, 29 cases with recent head injuries, 29 cases of post-traumatic syndromes and signs of brain damage, 28 cases of post-traumatic syndromes without signs of brain damage, and 30 cases with psychoneuroses. In addition, 15 normal controls were subjected to some of these tests.

2. The post-traumatic syndromes without signs of brain damage resembled the psychoneuroses more than the post-traumatic cases with evidence of brain lesions. The cases with recent head injuries were in many respects the most normal of all the patients studied.

3. Basal ventilation volume and tidal air increased proportionately with rising neurotic scores in the Minnesota Multiphasic Personality Inventory. The higher the basal ventilation volume, the smaller was the subsequent increase during work. Irregularity of breathing was measured by a new scoring method, which revealed that individuals with neurotic tendencies breathe irregularly, especially during work.

4. Metabolism under basal conditions and during work was higher in cases with signs of brain damage than in cases without evidence of a lesion. The more intelligent subjects were apt to use less oxygen than patients with average or sub-average intelligence.

5. During examination of endurance to strain (work of the hand during complete ischemia), all the cases with head injuries showed a smaller rise in heart rate than either cases with brain disease, psychoneuroses, or normal controls. Return of the heart rate to the initial level following exercise was delayed in the acute head injuries. Muscular tension was greatest in cases with brain disease and smallest in the normal controls. Endurance to strain was smallest in the psychoneuroses.

6. In conclusion, it can be said that there exists an antagonism between presence of brain damage and psychoneuroses. The more marked one component, the less obvious the other becomes. Cases with post-traumatic syndromes usually show presence of both components but with marked prevalence of the neurotic aspects.

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REVIEWS, ABSTRACTS, NOTES, AND CORRESPONDENCE

REPORT OF THE CONFERENCE OF THE COMMITTEE ON INFANCY AND EARLY CHILDHOOD

DETROIT, OCTOBER 25 AND 26, 1944

FEEDING OF THE NEW-BORN *

LAWRENCE K. FRANK, *Chairman*

PANEL DISCUSSION

CLARA DAVIS
FRANCES ILG
EDITH JACKSON
MILTON J. E. SENN
BENJAMIN SPOCK

THE NEWBORN AS A YOUNG MAMMAL WITH ORGANIC CAPACITIES, NEEDS AND FEELINGS

LAWRENCE K. FRANK

In discussing the newborn, we should recall what we all know, but what we may forget, or the significance of which we have not clearly recognized.

PRENATAL DEVELOPMENT

During gestation the fetus grows and develops all the basic physiological functions which are needed for living. Recent studies have shown that during gestation there is considerable rehearsal and practicing of various functions such as breathing movements (not breathing), a variety of reflex activities, kidney functions, and so on. It is also important to remember that during gestation, the fetus is being continuously nourished, receiving food through the placenta without interruption and robbing the mother when necessary for essential nutritional elements. It is also important to remember that babies are born in various stages of nutritional adequacy, depending upon the availability of needed nutrition prenatally and they are also born in various stages of developmental maturity. Apparently birth is governed not so much by the condition or readiness of the fetus as by the aging of the placenta and the involution of the corpus luteum. Hence, the newborn arrives in different conditions of nutrition and with varying degrees of maturity.

* This meeting was planned for supervisors of nursing in Departments of Obstetrics and Pediatrics.

NEWBORN

The human infant at birth is a young mammal, like all other mammals, such as puppies, kittens, calves, lambs, and so forth. He is functionally, decorticate since the cortex does not begin to function for a number of months after birth. Therefore, the newborn is primarily a reflex organism, primarily controlled by its internal environment but also very sensitive to the external environment. At birth the newborn is physiologically competent in the sense that the various organ systems necessary for living are well developed and functionally operative. Important to recognize is that while the newborn will grow in size, shape and weight and will develop and mature at birth, thanks to his mammalian ancestry, he is physiologically prepared for living. However, while each functional capacity is well developed and ready for active functioning, the newborn has very little capacity for coordination or integration of physiological functions and, therefore, cannot readily maintain a state of internal balance. The newborn lacks physiological reserves, capacity for compensatory adjustments since he cannot mobilize reserves easily or quickly or restore an imbalance when disturbed and he lacks homeostatic capacity in the sense that the several organ systems or functional capacities are not yet integrated with other functions. Thus, it has been shown that the infant's body temperature is unstable,

that he has little or no capacity for regulating his body temperature when exposed to heat or cold. His heart rate is highly variable; his respiration is variable and unstable; his water balance is poorly regulated and he cannot regularize and maintain a stable blood sugar level. As pointed out by Weinbach, the newborn has a static balance, not a dynamic balance, which means that when he is disturbed he does not have the capacity for restoring balance dynamically but must drift back to equilibrium.

(For studies of the newborn see Fels Fund Publications—especially L. F. Sontag. Denver Child Research Council, Publications by Alfred Washburn. Normal Child Development Study, Publications by Ashley Weech, Myrtle McGraw and Weinbach.)

As a young mammal, the newborn has the same organic needs as other young mammals. He needs close tactual contact, cuddling, licking, nuzzling, mothering and needs the opportunity to suckle and use his lips and he needs frequent, if not almost continuous, nourishment. These needs arise from the lack of homeostatic capacity in the newborn so that he gets cold easily, and cannot keep warm; his skin is exquisitely sensitive and needs contact for relaxation. He gets hungry quickly since his blood sugar may go down rapidly and he is unable to endure prolonged hunger without discomfort and distress.

The following excerpt from a letter from Dr. Anton J. Carlson of the University of Chicago, is interesting in this connection.

1. So far as I have been able to learn, the only bases for the four hour infant feeding schedule are: (a) the infants survive on that schedule; (b) the crying caused by the schedule is good exercise; (c) it is convenient for the mother and the nursery maid.

2. As you point out, this schedule is unbiological, judging by the infant feeding habits of domestic mammals, and man not under the guidance of modern pediatric dogma.

3. The contributions of my own and of my fellow students to this problem appeared, as follows: Carlson and Ginsburg, Am. J. Physiol., 1915, Vol. 37, p. 29; Patterson, Am. J. Physiol., 1914, Vol. 33, p. 423; *ibid.*, 1915, Vol. 37, p. 316.

In brief, our findings were these:

(a) In normal newborn and young infants the stomach becomes nearly empty in 1-1½ hours and hunger contractions start; these soon wake the baby, and he usually starts crying.

(b) In young infants and in young pups the quiescence of the empty stomach between the periods of hunger contractions is only 5-15 minutes, and the hunger contractions of the empty stomach are nearly continuous. The gastric tonus and contractions of the empty stomach of the infant and the pup are also more vigorous than in the adult of the species.

4. I have done no work on, and cannot pass on what unsatisfied hunger and in consequence excessive crying may do to the mentality of the infant. But I presume that that would vary with hereditary stability of individual infant's nervous system. The fact that only some infants become neurotics on the modern feeding regime seems to show that some can take it, even if they do not like it.

It is important to note that the close, intimate contact of the young mammal with the mother and the nuzzling and licking and the continual efforts of the young to nurse provide the major stimulus to lactation in the mammalian mother. Among domestic farm animals this stimulation is easily observed. The close contact to the newborn and the frequent nursing provide both the nourishment and the comforting which the mammalian young needs in adjusting to extra-uterine existance as an independent organism. Moreover, it has been shown that the colostrum is of vital significance to domesticated animals.

To the extent that the newborn infant is not provided with these mammalian needs, that is, is deprived of nuzzling, cuddling contacts, deprived of the opportunity to suckle, deprived of the frequent nourishment to which he has been accustomed, he is put under stress and strain which in some cases may be a severe physiological insult at a time when he is least able to endure such treatment because his homeostatic capacity has not yet been developed. Consequently when his blood sugar fails and gastric contractions begin, he feels hungry and cannot call on reserves and he is not able to equalize his blood sugar over a period of hours, such as he may be able to do later on. Moreover, prolonged deprivation and frustration of mammalian needs may provoke strong reactions of anger and rage or of fear and withdrawal since the capacity for these physiological reactions are well developed in the newborn.

Since the newborn has well developed organ systems and physiological capacities, what is done to and for the infant and what he is given or deprived of may become more or less persistent patterns of physiological reaction because they are being imposed upon these fully developed functional capacities. Likewise, if the treatment of the newborn provokes strong emotional reactions, they also tend to become persistent patterns of reaction because imposed upon fully developed capacities for emotional reactions.

The frequent pattern of newborn care, especially in hospitals, is that he is taken away from his mother, deprived of cuddling and soothing and of opportunity for sucking and the comfort of breast feeding. He is also prematurely subjected to prolonged fasting after having been continuously nourished during gestation and is subject to strong emotional provocation, allowed to cry uncomforted and to undergo prolonged fits of rage or of fear and anxiety. In consequence, eating, which should be a simple, pleasurable experi-

ence, may become an occasion for tension and emotional disturbances which may be the beginning of frequent feeding problems observed among pre-school children. It may be added that the practice of early toilet training may deprive the infant of sufficient opportunity to function as a young mammal and often it serves to make a simple physiological function an occasion for emotional conflicts and strong reactions.

It is worth remembering that we have a venerable tradition expressed in the injunction to love little children but in actual practice we more often follow the rule of "Catch 'em young and treat 'em rough."

Recent studies, both clinical and experimental, indicate that the way we pattern these early physiological functions of eating and elimination and the way we establish emotional reactions and feeling tones, of pleasure and confidence, of rage and anxiety, have a profound significance for the personality development of the child. It is highly significant that so many young children are being brought to physicians and to clinics because of feeding problems, thumb sucking, eneuresis and incontinence of bowels, negativism and hostility.

If we will accept the full significance of man's mammalian ancestry as it appears in the newborn, we must re-examine critically what we now believe and do with respect to the treatment of the newborn. Likewise, we should re-examine what we are doing to the mother and how we may deprive her of the needed physiological and emotional stimulation and fulfillment which she might find in the basic mammalian pattern of breast feeding and cuddling of her infant. For some unexplained reason we do not believe in babies. We cannot believe that they know when they are hungry and when they want to urinate and defecate and when they need to be comforted. Since modern medicine is built upon an acceptance of man's mammalian ancestry and the progressive understanding of his organic, functional needs and capacities, it may be urged that a similar approach to the treatment of the newborn offers promise of developing a more conservative practice, especially in hospitals.

SUMMARY OF DISCUSSION

The following summary is given of the main points of the discussion in which there was an informal give-and-take between the participants and the audience. Dr. Davis said that the first element in establishing breast feeding was to keep the baby close to the mother. The heat of the body is different from the warmth of electric gadgets, and the sense of smell is important in stimulating the desire to nurse. Dr. Davis felt that feeding the new-born must be a simple process, divested of the starched uniform, etc. Dr. Davis said that the breast should be completely emptied.

In relation to hunger and appetite, Dr. Liss commented that in the psychoneurotic frequently no hunger or appetite is felt, but that he will eat without appetite.

Dr. Ilg spoke of a patient of hers who habitually ate without appetite. When such a child first says "I'm terribly hungry" he should be given food at that moment when appetite is linked with the anticipation of food.

Dr. Spock spoke of how much we have taken the hospital system for granted. Mothers now think it is weird *not* to feed the baby at a regular time. In the normal pattern the baby cries to notify the mother, she nurses him, he is satisfied and goes to sleep. There is no "finishing the bottle technique" because hunger and satisfaction are the indices. There have been a few experiments in modern hospitals on letting babies feed when they wanted to. During the first three or four days the babies waked three to five times a day. Although on the fourth, fifth and sixth days they became more wakeful and demanding, waking eight to twelve times in twenty-four hours, they were down to about a four hour schedule when they went home from the hospital. Granting that hospital procedures cannot be changed right away to feed babies at will, they can still be less rigid.

Dr. Alfons Bacon raised the question of the general practice of giving new-born babies water to prevent dehydration. At the Salvation Army Hospital in Chicago an injection of saline is given and when this is done a weight loss does not follow.

Dr. Senn said that the possibility of inanition fever must be borne in mind but pointed out that the concern over this is usually exaggerated.

Dr. Davis said that water can be dispensed with unless there is fever. The difficulty of giving water is that it interferes with the appetite.

Dr. Spock replied that the study made in Chicago showed that breast feeding was much less successful when a bottle of any kind is given.

A nurse said that in her hospital breast fed babies got water at a week old. They do not take the bottle as well as those not breast fed.

Dr. Senn said that he was interested in this period of early feeding, and questioned whether sugar is necessary in the first few days. It frequently causes discomfort. Would it not be well to reevaluate the whole procedure both as to carbohydrates and in general?

Dr. Liss asked whether there was any relation between dehydration and the difficulty of the birth.

A nurse said that through a rather long period of observation she had noticed the weight loss in cerebrally injured babies was greater than in other babies. There is no weight loss in the premature baby.

Dr. Bacon thought dehydration was not related to difficulty of labor but came about because babies are swaddled with clothes and their activity is restricted.

Dr. Ilg brought up the practice of some other cultures in regard to swaddling, saying it was likely the baby wished to be swaddled. Internes learn very quickly to tell the difference between a swaddling or cuddling need, and the cry of hunger.

Dr. Ilg felt that asking a mother if she wants to nurse her baby is unwise. It is better to assume she will nurse the baby

and make preparations toward this. In 1936 and 1937 when Dr. Ilg was in Sweden she was struck by the fact that cracked nipples do not seem to be a problem there. In Stockholm all mothers nursed their babies. She gave an example of a woman in Oslo who worked two weeks to get milk in her breasts, using a wet nurse for the baby meanwhile. The two breasts should be used, for even when there is satiety with one breast the baby shows anticipation toward the other. Mothers in Stockholm also had ample opportunity to handle the baby as the baby was beside the mother's bed. This makes for rapport and prevents the anxiety which the mother may feel because she does not know where the baby is when he is not with her. Dr. Ilg commented on the quietness of wards in Swedish hospitals where babies are at their mothers' beds. In Sweden mothers keep notebooks of the baby's feedings. There was a simple record kept of the baby's weight, also made by mothers.

Dr. Spock commented on Dr. Ilg's remarks saying that theoretically he agreed that babies were best near their mothers but it was usually objected that this would be impossible because of the noise. He said further that he disapproved of a mother being trained to keep weight charts. This starts the mother off wrong. Let the pediatrician take the worry over the weight. The only good point about keeping the chart is that it is the one opportunity the father has to get a little closer to the baby, and find something definite to do.

Dr. Jackson asked Dr. Ilg whether the mother in Sweden keeps the baby from the first and cares for it. If so, what is the nurse's role. Dr. Ilg replied that the nurse does what is needed all along but encourages the mother to take over as soon as she is able. A nurse commented that while breast feeding is unusual in many places, there is a great deal of breast feeding in Chicago because of the interest in Dr. Bundesen. Another nurse asked Dr. Davis whether it would be a good plan to have a wet nurse to feed the baby in the first three days.

Dr. Davis said the matter could be safely left to the baby, who should be given opportunities to be close to the mother. He may take a little milk or a lot, but the little may prevent inanition, and the contact will stimulate the baby to get milk from the breast and to experience the satisfaction of doing this.

Dr. Jackson said the fundamental thing was to increase the rapport in the feeding situation. She asked whether there were conditions when bottle feeding could approximate the advantages of breast feeding. These would be in holding the baby and cuddling him while he had his bottle. There are three sets of conditions that present obstacles to breast feeding; (1) illness, including sore nipples; (2) failure to produce sufficient milk, (3) popular and professional attitudes against breast feeding. When these attitudes are too strongly set, it may be better to start the formula in the hospital and get the baby accustomed to it.

Dr. Jackson spoke of a number of studies that have been made in New Haven. Dorothy Marquis studied three groups of babies, one group on a four hour schedule, one group on three hours, and one on a self-demand schedule. Restlessness in these babies was the criterion. The best group was the self-demand group with the three hour group next.

In the New Haven Hospital, Dr. Jackson reported the Pediatric Staff has advocated breast feeding for the infants in the Nursery with increasing emphasis in the last few years. Nevertheless the percentage of artificially fed babies is tending to increase rather than decrease. In 1942, 82% of the mothers started to breast feed their babies, but at six weeks the percentage was only 68. In 1943, 75% started with breast feeding and only 53% remained at six weeks. There is no significant increase in mothers giving up nursing to enter war industry, but factors related to the general upheaval of wartime may of course be playing a contributory role.

Nurses often say that the mothers' attitude is not conducive to breast feeding or to general care, and comment on the mothers' lack of interest in cuddling the baby. Dr. Jackson cited cases to show that not all mothers who seemingly wish to nurse their babies are able to do so. One woman was part of a large family all of whom had been nursed in their own infancy, and all of her sisters nursed their children. At her request she was allowed to have her baby in her room at the hospital. When on the ninth day she had to give up nursing her baby, because of the painful condition of breast and nipples, she seemed to have a sense of guilt about her failure and said to the doctor, "I'm sorry to disappoint you." Similarly a mother who had been under treatment for a severe neurotic disorder reacted with an apologetic attitude toward the obstetrician and the psychiatrist, when the pediatrician terminated her unsatisfactory efforts at breast feeding on the fifth day. The mother had had an entirely normal pregnancy and delivery. She had attended Mother's Class and consciously wanted to nurse the baby. She was disappointed when the baby did not take her nipples well. Her first reaction was that he had failed her, was failing to do his part. She had impulses prompting her to throw him out of the window. Her subsequent feeling was one of her own failure to do what her friends and an advisor had expected of her. She was, nevertheless, relieved by the official sanction to wean the child.

Dr. Jackson felt, therefore, that there are some important psychological factors to be taken into account in deciding whether breast feeding will in a particular case benefit the baby.

Dr. Greenacre commented on the competitive role in which the women who had been a member of a big family may find herself. Women are especially competitive about having a baby. Some of the women who say they wish to nurse may not really wish to. These attitudes betray themeslves to the trained person.

Dr. Senn said it was clear that there should be some changes in the feeding and care of the new-born. There is too much partitioning out of care of both mother and baby at present. During pregnancy there should be consideration of the care of the nipples. Then there is at present a tendency to consider the neonatal as distinct from the later life period. Better cooperative procedures should be worked out between obstetrician and pediatrician. Eating and sleeping practices are started in the neonatal period, and changes cannot be made later by edict. Dr. Senn emphasized in this connection that changes are not made simply through edu-

cation and teaching on a purely intellectual level, but they come about most fundamentally as an emotional experience.

Dr. McDonald spoke of the work being instituted by Dr. Aldrich at the Mayo Clinic. He is planning to give the baby to the mother in the first three days so the baby can be known by the mother. Since this is before there will be any milk the mother will not experience failure when the baby sucks and there is no nursing.

The meeting was concluded with movies shown by Dr. Clara Davis of her experiments with the self-selection of diet by infants who had previously had no food but milk. She described the study saying that four babies from 7 to 10 days of age were offered four formulae in rotated order. All cut themselves down to four or three feedings a day. They chose a different formula at different times. They would push out the nipple they did not want after a few experiments. At some feedings they ate a lot and at others very little. The movies were of a baby at 7 months who was shown selecting her own diet. A boy was shown next. Dr. Davis commented that none of the 15 children in the study ever refused to try new food at the first presentation of foods other than milk after a brief weaning.

PHYSIOLOGICAL AND PSYCHOLOGICAL FACTORS IN FEEDING

MILTON J. E. SENN AND JOHN C. MONTGOMERY, *Chairmen*

INCIDENCE OF BREAST FEEDING IN DETROIT *

G. M. BYINGTON, M.D., DR. P. H.†

On July 1, 1942 a new plan was initiated, providing for four calls by public health nurses on all newborns at age of 1 month, 6 months, 12 months and 18 months. From this program we have collected some very valuable information. I should like to report briefly some of the observations made on breast feeding.

The number of infants involved here was 4,059 for a period of 3 months, and between ages of 4 and 6 weeks. The total number breast fed was 37 per cent, partially breast fed was 21.9 per cent; of the whole group 58.9 per cent received breast milk in whole or part. The place of birth apparently has a definite relationship to breast feeding—for instance one hospital showed 5.6 per cent, another 69 per cent, with values between for others.

A study of data involving 31 hospital born infants, for a group of 3,388 infants showed those breast fed varied from 11 to 81 per cent. A smaller number born in the home revealed of 671 infants, 15.1 per cent were breast fed.

Hospitals were classified into four groups:

I.	5	hospitals—less than 20 per cent breast fed					
II.	15	"	—from 20 to 35 per cent	"	"		
III.	7	"	— "	40 to 60 per cent	"	"	
IV. *	4	"	— "	67.8 to 80.8	"	"	"

* 4 colored hospitals with total 149 cases.

This brief report will be followed by others, in the mean time we should be pleased to receive comments and suggestions as to how breast feeding can be stimulated.

DISCUSSION

In the discussion which followed, Mr. Frank asked whether there had been any classification in terms of cultural groups and sanctions. Dr. Byington replied that this had not been done except for the fact the negro group is isolated from the others. Dr. Ilg asked whether the different hospital procedures could be given. Dr. Byington said he could not give them but he was willing to say that different procedures as used in various hospitals might make a difference. In regard to the question on cultural groups Dr. Montgomery spoke of the fact that there are hospitals in Detroit with the same cultural clientele but with different ratios of breast-feeding.

* Abstract.

† Director, Child Welfare and School Health Department of Health.

BREAST FEEDING FROM THE OBSTETRICIAN'S VIEWPOINT *

HOWARD C. WALSER, M.D.

The average teaching of medical students in regard to encouraging breast-feeding among prospective mothers is still entirely inadequate. Although, as the author pointed out, definite scientific proof that breast feeding is better than bottle feeding does not exist, in his practise he has attempted to promote and increase breast feeding among his patients with encouraging results.

From the first visit, the assumption is made that the patient will nurse her baby, and suggestions of a positive nature, such as "You have good breasts" are given throughout pregnancy. If the mother makes the flat statement that she will not nurse the baby, the reason for this is asked and a process of gradual reeducation is undertaken. However any bludgeoning or forceful approach in the face of deep-seated animosities must be avoided. If the patient refuses to feed her baby after delivery the baby is promptly put on a bottle.

Even if a mother has been unsuccessful in nursing previous babies, she can often be easily persuaded to try it again. But there does seem to be a definitely increasing number of patients in this group who do not successfully nurse their babies. This may be physiological, psychological, or an attempt on the part of the patient to prove. "I told you so." No hormone aids to breast milk formation have had much success. The best combination for a good supply of milk is still a happy, contented mother and a vigorous, hungry baby.

The visit of the prospective father to the obstetrician should be encouraged. The mother's reaction to the fact that this is a "community project" is almost always favorable. The baby is going to belong to both of them and a certain amount of rapport results from an interview with both parents.

The care of the breasts pre-natally has never been studied and nothing is known about it. Among the methods recommended by various authorities are the use of alternating hot and cold water, brushing the nipples, alcohol to harden them, ointments to soften them, massage with the bare fingers or rubbing in everything from super-fatted soap, lanolin and cologne water to cocoa-butter, olive oil, etc. The probabilities are that the best toughener for the nipple is a nursing baby and the author feels that in many cases the mounting incidence of cracked and sore nipples is not because the nipple has too little rest between feedings but because in many cases the baby is kept in the nursery too long after birth and brought in so infrequently that a starving, ravenous baby results and the mother's breast is damaged by the child's own efforts. The author also feels that covering the breasts with sterile gauze, having the early secretions dry and the sticking gauze removed at every breast-feeding is harmful. Heat, air, dryness and soap-and-water cleanliness is considered the best method; this, however, he states as a personal opinion which has not been proven by definite control of cases and comparable parallel studies.

Inverted nipples present a problem which can only be met by a vigorously nursing baby when the tissue is not too inverted. However, unexpected results may make any effort worthwhile.

The English Committee which studied the problem of breast-feeding in an attempt to obtain 100% breast-fed babies gave the following reasons for failure:

1. The physiological incapacity of certain mothers to feed their babies.

2. The refusal of certain mothers to feed their babies.

3. The over-mechanization of hospitals when compared to home maternity cases.

4. The ease with which the patient can resort to formula feeding.

In suggesting a remedy, they came to the conclusion that since lactation seems to be more readily established when confinement has taken place at home, these differences might be remedied by treating institutional cases in a more natural and matter-of-course manner. Their recommendations include the following:

1. That more elasticity of hospital practise be planned in order to allow the mother and baby to become accustomed to each other.

2. That less attention be paid to frequent weighing of the baby which, in turn, means less insistence that the baby get a certain amount every time it goes to breast.

3. That the initial neo-natal weight loss should be stressed less, consequently, the forcing of extra feedings on the baby to change this weight loss would not be done.

DISCUSSION

In the discussion following this paper, it was asked how many of the fathers Dr. Walser sees in the course of the mother's pregnancy. Dr. Walser thought about 20%.

Dr. Senn said in some hospitals the baby was put to the breast at 12 hours, and asked whether in Dr. Walser's opinion this should be done earlier.

* Abstract.

Dr. Walser: "Yes, as early as the baby can be recognized by its mother it should be put to the breast."

Dr. Senn: "How soon again?"

Dr. Walser: "There you are bucking hospital techniques. Every four hours is my preference. If the self-demand schedule were possible it would be better."

Mr. Frank said the discussion up to this point had brought out the need for careful investigative work on a number of points on which we do not have scientific information. He asked whether we could go on record as saying these studies need to be made, and pointed out that one of the first problems would be to determine criteria for evaluating what is "best." Certainly what is desirable for the mother is a part of this problem. In this connection he mentioned the generally accepted idea that nursing helps to restore the uterus more quickly to its normal size.

Dr. Walser commented that we have no statistics on the size of the uterus as related to breast feeding. Although this is mentioned as a fact in every obstetrical text-book, it is not proven.

Dr. Spock said it might be possible to begin to study the problem of cracked nipples and get statistics on procedures related to this. It might be really better not to wash the breast after nursing.

Dr. Walser agreed. He said that in history-taking such comments come out as, "I don't want to nurse the baby." Sometimes it is the husband who does not wish it. Dr. Walser said he had not had a breast abscess in two or three years. He takes the baby off the breast when the nipple is cracked, uses one or two per cent silver nitrate, keeps it dry and uncovered. Forty-eight or seventy-two hours will tell whether it will heal.

It was asked whether women who have had cracked nipples during one pregnancy are more likely to have them again.

Dr. Spock said that Dr. Greeley, an obstetrician in New York, found he did not get abscesses in his patients even when the nipple was cracked.

Dr. Montgomery then called upon Dr. Bartemeier to comment on the objection of husbands to their wives nursing.

Dr. Bartemeier said that these husbands usually had a long history in their own lives of which they are unaware. This traced back to their own jealousy of their siblings in a like situation. The husband may also be jealous of his wife as a mother because she can have a child and nurse a child.

Dr. Hendrick said that the wife may report it as her husband's wish when it is really her own. When this is the case, it is simpler to treat.

Dr. Montgomery asked what the influence of nursing was on the shape of the breast. Dr. Walser said that nursing does not change the shape; it is pregnancy which changes it if anything. Dr. Pratt said it was possible that the way the baby is held might affect the breast. Dragging down might change the shape, although he has no figures to support this.

Dr. Montgomery asked what some of the things which had been said meant in so far as the present status of medical education is concerned.

Dr. Senn spoke of the fact that second-year medical students watch a new-born baby nurse with great interest. The fourth-year student is bored and sophisticated. There might well be some reevaluation of timing in teaching these things.

Dr. Spock said that the making of the formula was the vested interest of the pediatrician. That fact may affect the teaching given.

CURRENT HUMAN MILK STUDIES *

ICIE MACY HOOBLER

In the fall of 1943 a collaborative study on the reevaluation of the vitamin, mineral, fatty acid and amino acid contents of human and cow's milk was undertaken at the request of the Nutrition Foundation by the Obstetric and Pediatric Departments of the Henry Ford Hospital and the Research Laboratory of the Children's Fund of Michigan in Detroit working on breast milk, and by the School of Nutrition of Cornell University similarly observing cow's milk. All samples of milk to be analyzed were collected under known and standardized conditions, using the newer most accurate procedures. The results are being integrated so that fuller knowledge of infant feeding and dietary requirements may be determined. Included also are observations on the dietary requirements of the nursing mother and the changes that may occur in the composition of breast milk as lactation progresses.

Over 200 women have participated in one or more phases of the study, twelve of whom started at the time of parturition. They permitted complete 24 hour collections of milk by manual expression, and of urine by catheter during the first 10 day post partum and all the foods eaten were analyzed. Quantitative collections of milk, urine and food were repeated for five successive days at the third month and again at the sixth and eighth month if milk were still flowing. The milk and foods were analyzed for vitamin A, carotene, thiamine, riboflavin, niacin, pantothenic acid, biotin, ascorbic acid, protein and energy. Fatty acid distribution studies have been made on the milk by the Department of Chemistry, University of Pittsburgh. Nitrogen distribution studies have been made on milk and urine. The milk and food samples are now being analyzed for their mineral content, including the so-called trace elements. In short, when these

* Abstract.

milk studies in their entirety have been completed and published, they will be the most complete ever to be made and coordinated. They should have significance in the care of infants and mothers.

DISCUSSION

Dr. Rexford asked which vitamins carried over into the mother's milk.

Dr. Hoobler replied that this varies with the stage of lactation, though they were given in the same quantity. They carried over more at three months than they did later. Similar studies on cholostrum are being done on cows at Cornell University.

Dr. Walser asked whether the amount of milk is ever sufficient but the quality poor.

Dr. Hoobler said that when the amount is sufficient, all babies have done well.

Dr. Senn asked what the "thinning out" of the mother's milk means?

Dr. Hoobler replied that the first milk which is expressed is quite different from the last. The first is actually thinner; the last carries in some cases twice the fat and is much more concentrated.

Dr. Senn said that Holt's studies at Johns Hopkins show that the baby can synthesize some vitamins.

Dr. Jean Pratt discussed the basis on which women were selected for Dr. Hoobler's study, saying that women who were as nearly normal as could be judged, who had sufficient milk and who would cooperate by continuing to nurse were chosen. Dr. Pratt said that previous studies have shown that in the first five days it can be told whether the mother will have milk and will continue to nurse.

CASE HISTORY OF THE FIRST THIRTEEN MONTHS OF LIFE OF A PAIR OF TWINS BREAST FED ON A SELF-DEMAND SCHEDULE *

GENEVIEVE TRAINHAM

Peter, weighing 8 pounds, 5 ounces, and Sherry, 5 pounds, 9½ ounces, during their thirteen days in the hospital were nursed on a four hour schedule. On the fourteenth day self-demand was initiated and the babies permitted to sleep or to nurse at will.

Each infant dropped the sixth feeding at once except very occasionally and, even from the third week, frequently demanded only four feedings in twenty-four hours. By the eighth week the 5-feeding day had almost completely disappeared, and from the ninth week the 3-feeding day was frequent. From the sixteenth week for Peter and the seventeenth for Sherry the latter was the usual feeding demand. There was increasing regularity of feeding interval for each infant with some schedule apparent even in the third week.

Solid foods, which were begun at two months, were quickly accepted by both babies.

Beginning at three months orange juice was given from a cup. In the thirty-second week milk from a cup was substituted for the breast at the noon feeding and readily accepted by each infant. Other breast feedings were rejected by the babies themselves, first the morning feeding and, finally, the evening feeding by Peter at nine months and by Sherry at ten and a half months.

Each infant was allowed to nurse at any time as long as desired, and nursing periods ranged from three minutes to fifty-five. Sherry has never sucked her thumb while Peter sucked his almost constantly at four months and in moments of stress at thirteen months.

For both babies gains in length, weight and skeletal age have been satisfactory while developmental progress has been superior.

Two factors contributed largely to the mother's success in nursing twins in this manner: first, psychological readiness, and second, excellent nutrition throughout the prenatal and lactating periods.

DISCUSSION

The discussion centered mainly around how Peter's thumbsucking was to be explained. It was agreed that there were X factors in this; since Peter was the child with the more satisfactory feeding experience and the better relation to, and acceptance by, the mother. It was asked whether Peter's thumbsucking started soon after the attempt by the parents to deal with Sherry's continued wakefulness at night by giving her more love and attention.

Miss Trainham thought it possible that the fact Sherry walked before Peter, had influenced his continuance of the thumbsucking pattern.

* Abstract.

AN IMPORTANT PSYCHOLOGICAL FACTOR IN BREAST FEEDING *

EDITHA STERBA

A normal emotional development depends upon a healthy relationship between mother and child in the suckling period. Neither psychoanalytic nor pediatric literature has contributed much toward knowledge of this remote developmental period. A case in which a 3½ month old girl with an excellent relationship to the mother rejected the breast when, after a segmental mastitis developed due to the baby's pulling of the breast, the mother was obliged to inhibit this oral aggressiveness, was presented. This inhibition was intensified through the mother's necessity to divert attention from the baby to her work, and the child turned from mother to nurse. Normal feeding and a normal mother-child relationship returned when rubber toys were substituted as an object for the pulling, and when more attention was given the baby by the mother. This was followed by a normal weaning of four weeks duration, the beginning of talking at 6½ months, and a normal subsequent development enriched by a gift for languages. The case illustrates how, in spite of a healthy mother-child relationship, the intense but normal oral sadistic aggressiveness caused an eating disturbance because of the child's need to gratify its oral drive to possess the breast. That the difficulties disappeared when substitute gratifications were given and more attention was paid depended also on the good relationship of the mother with the child. The case illustrates a suckling's ability to distinguish between mother and nurse, also between mother and breast, and also that a certain gratification of oral aggressive instinct is necessary for a normal suckling period. An important contribution to libidinal development is seen in the fact that sadistic tendencies are present even before teething. These aggressive destructive tendencies must be gratified to some extent if the suckling period is to be normal.

* Abstract.

DISCUSSION

Dr. Hendrick questioned the statement that the patient should be considered a "normal" woman. The patient's previous history, her analysis, and her dependency on her analyst and associates in caring for the child seem to indicate that this mother was more motivated by acting out mother love to please her mother surrogates than by a mature material instinct.

Dr. Greenacre suggested that this sort of aggressive reaction was sometimes related to the early development of speech. Dr. Spock said he had seen this behavior in babies from 3 to 7½ months, both in the case of those who were breast-fed and of those on a bottle. This is often related to teething. The baby who will not take milk at this time will often take solid food.

SOME MEANINGS AUXILIARY TO BREAST FEEDING *

JOHN M. DORSEY, M.D., AND ELIZABETH HARRINGTON, B.A.

The physiology of lactation takes into consideration the fact of psychological force; the "meaning," that is, the psychological structural value, of breast-feeding, takes into consideration non-psychological power. The nature of instinct development in the given individual influences the meaning value of different parts of his body. The psyche "minds" its breast meanings according to this development. The observing, collecting, classifying and synthesizing of his first self-discoveries appear to constitute the ground work of the perceptual conscious system of the infant's ego. It appears that the baby cannot at first distinguish its mother's breast from its own body. The kernel of his "body ego" may be the oral-nipple relationship. If there is an expression of inordinate tension between the mother's ego and super-ego then the need on her part to be a baby and have a mother, rather than to be a mother and have a baby, can show itself up in guilt feelings about breast feeding. The father must contend with a similar change of role. A true meaning of breast feeding for a mother is a great sense of power over the infant. Marriage is a bio-social enterprise that permits the play of a baby kind of transference between husband and wife, hence it is that the baby can be conceived not only as a homemaker but also as a home breaker. "Three is a crowd" particularly where the third party is the baby of the other two. Some oral-nipple deprivations and indulgences influencing character development are listed. Clinical data reveal the breast as an object presentation of key "meaning" and as an external object of great power for psychological illness and health.

* Abstract.

THE MINNESOTA PERSONALITY TEST IN RELATION TO SELECTION OF SPECIALIZED MILITARY PERSONNEL

MAJOR HAROLD A. ABRAMSON, M.C.

INTRODUCTION

The selection of suitable officer personnel for the Armed Forces is of especially serious import when the officers are to be charged not only with military but also with scientific duties. The activities in the group of officers to be discussed here combine much desk work with duties in the field and in the laboratory. Superimposed on these activities is constant contact with civilians who operate out of military channels. There occur frequent heated discussions of controversial questions of many types which have a most direct bearing on the war effort. There is clash of temperament, information and motive. Since most of the officers are reserve officers or directly out of civilian life rather than members of the Regular Army, the coordination of scientific and military tasks is especially complicated. Many situations arise, therefore, in which fundamental character traits of forebearance, patience, objectivity and insight are strained by the deep emotional desires of the individual to fulfill what he, himself, considers his role and the rewards thereof in the war effort, irrespective of channels and custom.

Officers chosen for this type of work usually have advanced academic degrees and a certain amount of experience in both the military and scientific aspects of the tasks to which they are assigned. It takes an appreciable time for an officer to learn the details of the scientific projects to which he is assigned because the data are classified (secret, confidential, or restricted) and ordinarily are not available in texts and current literature. Frequent changes of personnel are neither desirable nor possible. In filling staff and command positions by officer personnel, the suitability of an officer for his particular function is often a major decision. This decision may be aided by the application of the results which the writer has had from the opportunity, during the past two years, of studying (2, 3, 4) (by means of the "Multiphasic Personality Inventory," Hathaway and McKinley) the personality profiles of a group of officers who have been assigned to staff or command functions in a scientific branch of the war effort, solely devoted to research and development. The writer himself had the same assignment, so that there was constant contact with nearly all of the officers described.

It is the purpose of this communication to assay the relationship of the personality profiles to the emotional stability and function of these officers in rather difficult and specialized assignments. Although our data are limited to 28 cases and our conclusions are necessarily restricted by the small number of cases, the unusual circumstances of the test seem to make the study of immediate practical value.

PROCEDURE

The subject was asked to sort the 550 test cards which cover a wide range of subject matter into three categories of True, False, and Cannot Say. The profiles were then plotted according to the classifications now available for scoring: Cannot Say (?); Lie Score (L); Validity (F); Hypochondriasis (H); Depression (D); Hysteria (Hy); Psychopathic Personality (Pd); Masculinity-Femininity (Mf); Paranoia (Pa); Psychasthenia (Pt); Schizophrenia (Sc); Hypomania (Ma).

The lie score (L), as well as the validity score (F), merit special comment. The L score is a measure of the desire of the subject to modify and improve himself, especially in the most acceptable social light according to his known notions of social acceptability, as delineated by certain test questions. Although a high lie score does not necessarily invalidate the other scores, it indicates that the values most representative of the basic characteristics of the subject are probably higher than those obtained.

According to Hathaway and McKinley, the F score is a check on the validity of the whole record. Carelessness on the part of the subject, incomprehension or errors may lead to a high F score. On the other hand, if the F score is low, it indicates the reliability of the subject's responses.

It is most important in considering the following 28 cases to realize that the writer is only using the test as a measure of the efficiency and function of a small group most carefully studied over a long period. The categories studied are viewed with a specific idea of correlating the adjustment and efficiency of the officer group with the shape and height of the curves. In other words, this group of officers and their profiles were studied over a period of from one to two years to establish interpretations, which are, therefore, different from those which would be used in broader clinical evaluation. The interpretations are specifically directed toward aiding in the selection and management of individuals with specific characteristics. For this reason, minor deviations noted here are given more emphasis than by Hathaway and McKinley be-

TABLE I

	?	L	F	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma
1.	50	*53*	50	53	*72*	55	40	*61*	38	52	47	52
2.	50	*53*	50	42	29	42	27	26	*62*	45	38	39
3.	50	50	50	47	44	*65*	42	51	50	41	40	37
4.	50	50	*58*	47	42	44	37	47	45	42	52	42
5.	53	*56*	50	40	53	*62*	37	*67*	50	36	40	43
6.	50	50	50	47	52	*60*	47	58	55	45	44	52
7.	50	50	50	44	51	*60*	50	51	50	39	43	48
8.	53	50	50	44	56	*64*	42	57	50	42	37	43
9.	50	50	50	58	58	*69*	42	*61*	44	43	44	50
10.	50	50	50	44	48	*60*	42	53	53	41	40	40
11.	56	50	50	44	46	56	42	*65*	44	39	38	39
12.	50	50	*55*	40	48	51	42	57	50	42	44	41
13.	50	50	50	40	53	56	47	*63*	59	43	48	41
14.	50	50	50	42	51	58	*63*	*71*	56	46	48	39
15.	53	50	*53*	56	56	*60*	58	55	*65*	46	53	59
16.	50	50	50	40	46	45	40	*71*	59	43	49	54
17.	50	50	50	44	51	51	45	51	53	48	40	39
18.	50	50	50	44	*72*	53	53	*71*	56	*63*	53	59
19.	50	50	50	40	53	51	37	*67*	53	53	51	52
20.	56	50	50	50	53	51	*62*	53	59	45	40	54
21.	53	50	50	*60*	*68*	*60*	58	51	41	50	44	50
22.	50	50	*64*	46	*63*	*60*	*60*	*65*	50	59	*68*	*61*
23.	53	50	50	44	48	*60*	*63*	*69*	59	54	55	50
24.	56	50	50	58	*68*	*73*	58	*61*	38	42	51	39
25.	50	*56*	50	49	53	47	48	45	41	45	42	43
26.	50	50	*58*	48	35	40	52	55	51	53	49	59
27.	50	50	*73*	56	*65*	*64*	*75*	*76*	*62*	59	*75*	*63*
28.	50	50	50	*60*	46	51	42	51	50	*61*	49	*61*

cause these deviations were correlated directly over a long period with the conduct, attitude, adjustment and efficiency of the officers involved. For example, more emphasis is placed on moderate elevations of the lie (L) score in the group discussed here than would have been placed by Hathaway and McKinley. This is not in conflict with the point of view of Hathaway and McKinley but is based directly upon the experience of the writer with officers who show moderate elevations of the lie score. An officer who shows even moderate elevations of the lie score often will over-conventionalize his own position. It is of interest that in 24 out of 28 cases here described the lie score was 50 with only 4 above the 50 mark.

The significance of an increased F score is most apt to indicate a lower profile rather than an important change of the shape of the curve. With these considerations in mind, consult Table I, the figures and the accompanying discussion. In view of the small number of cases, the conclusions are tentative and must be evaluated accordingly.

In the brief case histories, age and grade are omitted to prevent identification.

1. Married. This curve shows a high D and high Mf, compared with the rest of the curve. His marriage occurred quite late in life. After taking the personality profile, the writer told him that he was surprised to find that he was a "gloomy gus." "Why, yes," answered the officer. "You have never understood me really. You have always thought I was happy-go-lucky, and just the opposite was true." In spite of a high D score, he has stayed in the same work for more than two years, and has proved to be an invaluable staff officer in a difficult post.

2. Single. This is a rather interesting curve in an officer who is well adapted to a special type of staff work and has been successful in carrying it out. The significance of the low values in the scoring has not been ascertained by Hathaway and McKinley. However, in this score, there is a comparatively pathologically high Pa and L score. This characteristic at first interfered with this officer's performance of his duties. The test was subsequently done, and the implications of the peak were explained to the officer. Thereafter, with recognition of the affective situation, the staff duties performed by the officer increased in value until he became an important part of a smoothly running organization.

3. Married. This is an essentially normal score of an officer who, under difficult conditions, adapted himself to the work to which he has been assigned.

4. Married. This subject has been in the same position for more than two years, doing staff work of a difficult scientific and administrative nature. Although the profile is fairly valid and is essentially normal, the high value of the F score might indicate this officer's ability to camouflage his attitudes. During the time of his service, he has had typical conversion symptoms when difficult situations arose in connection with his work where frustration of duty has occurred because of "channels" and other organizational factors. No loss of time on duty was incurred nor was sedative required. It is of interest that, in spite of these marked conversion symptoms, the Hy score is normal.

5. Married. This officer is eminently successful in staff work. His high Mf peak was satisfactorily explained to him as mother and wife dominance to which he readily agreed with sympathy and interest. It is pertinent in this officer's case that he has a comparatively high L score and a low F score. The duties of his position are such that his desire for conventionalization as indicated by the L score is of great value to him, it is believed, in his staff work.

6. Married. This is an essentially normal curve of an active successful officer who can exercise readily either staff or command functions.

7. Single. This is the curve of a well-balanced officer, who has exercised both staff and command functions with a great deal of success.

8. Married. This officer has, without any difficulty, succeeded in maintaining his work as scientific liaison officer, involving both technical and military problems. The relatively high D, Hy and Mf values fit in fairly well with his own case history.

9. Married. The relatively high Hs, D, Hy, and Mf values have, in no way, interfered with this officer's staff functions over a period of years. Note L and F scores.

10. Married. This is the profile of a very capable officer. Hy, Mf and Pa scores are slightly high compared with the baseline, but they have no significance as far as his work is concerned.

11. Married. The relatively high number of "cannot say's" did not prevent this officer from exercising an important command function, which he is still exercising, for about one year. His relatively high Mf score is apparently of no significance as far as his work is concerned.

12. Married. This officer married late in life. He was, without much difficulty, able to work under an officer with an unusually unpleasant personality without showing much external evidence of discomfort. He succeeded in transferring to a better position. His essentially normal curve fits in with his ability to adapt himself to a difficult situation.

13. Single. This officer has been able to fit into difficult staff functions, essentially non-technical in nature. The significance of the low Pd is not known.

14. Married. This officer was successful at staff work for more than one year when he was transferred to a less arduous position. The writer does not know whether it was he or his superior officer who was at fault in the failure of this officer to be retained in his originally highly responsible position.

15. Married. This curve was obtained on testing an aggressive, active, somewhat irritable officer, whose profile fitted in fairly readily with his general personality. He is excellent in his staff work and is able to stand the barrage of criticisms in spite of his relatively high Pa score. He has been retained in the same position for almost two years, but under a most sympathetic superior.

16. Single. This unmarried officer has an exceptionally high Mf score which, when related to the rest of the curve, might be pathologic in nature. However, no difficulties have arisen, to the knowledge of the writer, and he has been retained in staff and command work for more than two years without difficulty. He has had increasing responsibility as the war has progressed. It is true that in this officer's case, his training and talent are superb, and it is believed that with his combination of background and insight into technical problems, a high Mf peak of the type described should not interfere with his military activities if motivation for social acceptance (as is here the case) is high.

17. Single. He is an easy-going type, exercising a fairly simple type of staff work, well adapted both emotionally and by training to his present function.

18. Married. In spite of having three values above 60 and the highest value of Ma in the series of "well adjusted" officers, this individual had no outward difficulties. Note the low values of the L and F scores. However, he waited with a great deal of anxiety the outcome of the test because of an impending important change in his personal life. Discussion revealed timidity and uncertainty until a late period in life as characteristics which, however, success in the army decreased markedly.

19. This is the curve of an exceedingly capable officer who, in spite of difficulties, has adjusted himself to tasks requiring all of his technical background and much patience.

20. This officer is well adjusted and exercises his staff work with a great deal of care and assurance.

21. Single. The high D, Hy, Hs, Pd, and Pt scores of this officer have not interfered appreciably with the staff functions which he has carried out successfully for nearly two years. However, he is definitely subjected to moods, but withal in his duties very active and very alert. If anything, his emotional instability provides a background from which he wishes to escape by immersing himself in his duties. Note the L and F scores. (See fig. 1.)

22. Married. In spite of this officer's fairly high F score and relatively high D, Hy, Pd, and Sc scores, he has been an aggressive, shrewd, capable staff officer for more than two years, exercising most difficult coordination functions with meticulous attention to detail. Whether or not he could act in a more subordinate capacity is uncertain.

23. Married. Except for the high value of Pd and Mf score, this married man, with two children, has occupied a very subordinate position, in spite of an excellent background. He has shown definite conversion symptoms during his work resulting in time loss in a command function, but he has come through all of his emotionally difficult situations readily and resumed his task, probably because of an excellent family situation.

24. The high value of 73 in the Hy category fits in with

this patient's history. The corresponding diagnosis of conversion psychoneurosis was made clinically in the hospital because of an important group of symptoms unexplained by organic change. He has lost much time because of the elaborate medical routine required to justify the clinical diagnosis.

25. Single. This curve is one of the most normal in the group. At the same time, the L score is a fairly high one for this particular group of officers as will be evident from study of the rest of the charts. This officer, in spite of the normal curve was not particularly satisfied with or adaptable to his duties. He was an individualist, colored by egotistical responses and almost pathologically ambitious. The value of the L score, comparatively high for this group, in spite of the remaining valid portions of the curve, would, in the opinion of the writer, constitute an element of objection to his selection. (See fig. 2.)

26. Single. The high Ma score fitted in with this officer's general behavior. The fact that this point is the highest made him somewhat unsuitable for work confined to personal contacts. He was on the go, took commands readily, was highly cooperative, but invariably got into minor difficulties of one sort or another. He was more fitted for field duties because of his aggressiveness and jovial attitude. He was transferred after a short period. (See fig. 3.)

27. Married. This officer has succeeded, in spite of a definitely abnormal curve, in working under suitable conditions for more than a year, performing staff functions. During that time, certain problems of adjustment came up, which, however, were inevitably compensated for by his fundamental talent for his work. However, the inherent personality difficulties illustrated by this curve finally injected themselves by changes of duties more frequently than usually occur in this series. Officer personnel showing an abnormal F score as well as the other high peaks disclosed here, should only be chosen for work which will not give rise to personality difficulties to be found in staff or command functions.

28. Married. The high values of the Hs, Pt and Ma scores might have, under other circumstances, interfered with this officer's staff work. It was fortunate that the personality characteristic evidenced by his relatively high Ma score was utilized by him fairly successfully for short periods of intense activity to carry out detailed staff activities. This success was partially due to a sympathetic environment. It is not considered desirable to employ officers showing curves of this type in situations which might lead to even minor frustrations unless the immediate superior is willing to overlook moodiness and periods of dissatisfaction.

Discussion

All of the 28 officers described have shown some degree of adaptability to the difficult technical and personal contact work assigned to them. With few exceptions, depending upon the interpretation of the data, they have fallen within the limits of normal set by Hathaway and McKinley. The cases studied (Table I) were classified on the basis of the writer's opinion of the military efficiency of the individuals comprising the group, and on the presence of symptoms into three groups: (a) cases 1 to 20 with essentially good military efficiency with no severe symptoms of persistent difficulties; (b) cases 21 to 24 with occasional severe symptoms but with minor impairment of efficiency; (c) cases 24 to 28 who encountered adjustment problems in connection with their work.

None of the men, even the four cases under (c), failed completely. They merely represent in the writer's opinion a group requiring special attention under their particular conditions of placement. All of the men in group (c) with suitable placement of their particular talents might fall out of group (c) and move up to group (a) or (b). However, the probability of finding suitable placement is less for the members of group (c).

Further detailed analysis of the data in Table I must be somewhat arbitrary. The following method has been utilized to analyze the scores. Values above 50 in the L and F scores have been italicized, as were all values of 60 or more in the remaining categories. Note that in cases 1 to 20 only one subject (18) had three scores of 60 or more. Six others in this first group had two scores of 60 or more. Indeed, No. 18 was characterized by apprehension over the outcome of his test and desired to have it completed before an important incident occurred in his personal life. In group (b), cases 21 to 24, either important loss of time due to hospitalization for diagnosis without somatic findings or excessive sedation was required. It is of interest that all four officers of this group had at least three scores of 60 or more. In group (c), cases 25 to 28, note the following: case No. 25—a high lie score with a normal curve; case No. 26—the Ma score is the highest point in the score; case No. 27—a generally elevated curve, the highest of the twenty-eight cases; case No. 28—three values of 60 or more with the Ma score again significantly high.

The Ma category deserves special mention at this point. Whereas only two of the first twenty cases had values of Ma above 55, four of the eight cases in groups (b) and (c) had values of Ma above 55. In the same way, the F score of groups (b) and (c) are of interest. Three of the eight cases in these two groups had F scores ranging from 58 to 73 whereas only three of the preceding well-adapted twenty cases had F scores ranging from 53 to 58.

The comparatively high value of the L score in case No. 25 may be of significance in view of the unusual occurrence of high values of the L score in this group. In light of this point of view, note the values of the L score above 50 in cases 1 to 20. Cases No. 2, with an L score of 53, might well have fitted into group (c) if the symptoms occurring correspond-

ing to the high value of the Pa score were not recognized and brief therapy successfully instituted. Cases 1 and 5, with values of the L score of 53 and 56, definitely make use of the trend to over-conventionalization in performance of their military duties. It is believed that the low values of the L score in the group as a whole fit in with the scientific training and attitude of the group. Only when this training cannot readily be applied to the life situation will the L score be elevated and then only slightly.

Illustrative curves are plotted in figures 1, 2 and 3: Case No. 21 is illustrated in figure 1. The middle curve is the profile obtained under average conditions. The top curve is that obtained during a period of depression following a specific incident. Note the remarkable similarity in shape of above curves to the lowest curve which was obtained after alcohol. A report on the effect of alcohol ingestion has recently been made (3). The high values of the scores of this officer have not interfered appreciably with his staff function although he definitely fits into group (b) as described hitherto. Indeed, even during the period of depression just mentioned, this officer remained on duty because of a deep interest in his work. If his duties had been unpleasant, it is probable that some difficulty would have arisen. Case No. 26, with a value of the Ma highest in the profile, is illustrated in figure 3. Note, in addition, the comparatively high value of the F score. Case No. 25 (figure 2) is unusual because of the flat curve with a high value of the lie score. This officer, on the basis of extremely meager knowledge and training, often repeated that he "knew more than anyone in the ——— Service about ———."

As noted by Hathaway and McKinley, intelligent, well educated individuals are apt to have high values of Hy score. In addition, here may be noted frequently occurring high values of the Mf category. Indeed, the median value of the Mf on the basis of this short series is close to 60. Whether or not this is statistically significant must be reserved for a future study.

In conclusion, then, on the basis of this small series it appears that if a normal personality curve is obtained, and if the stable performance of military personnel in a field where combined military and scientific efficiency is required, the Minnesota Inventory may provide an adjuvant screening device. As more data of the type here given are obtained, further refinements of the screening process will increase the precision of the method. Given a "normal" personality curve without undue elevations of the L and F and Ma scores, the selection of officers charged with combined scientific and military duties of the type here described rests essentially on placement leading to enough occupation with the type of work in which the officer can express his technical and creative talents as contributing to the war effort. If elevated values of either the L, F, Ma or general level is obtained, the placement problem requires additional security.

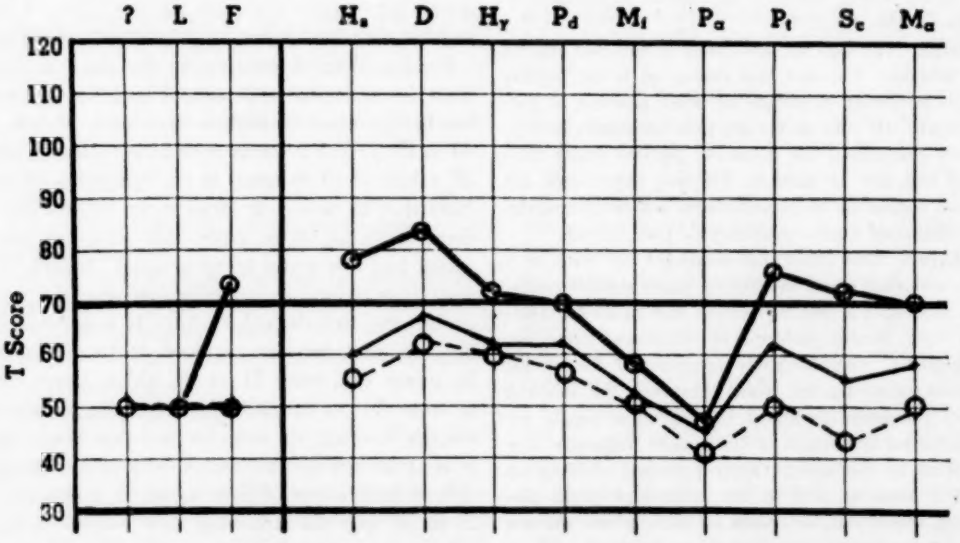

FIG. 1. (Case 21.) The middle curve is the profile obtained under average conditions. The top curve is the curve obtained during a period of depression. Note the remarkable similarity in the shape of both curves to the lowest curve which was obtained after alcohol. The effect of alcohol ingestion is described elsewhere (1). See text for further discussion.

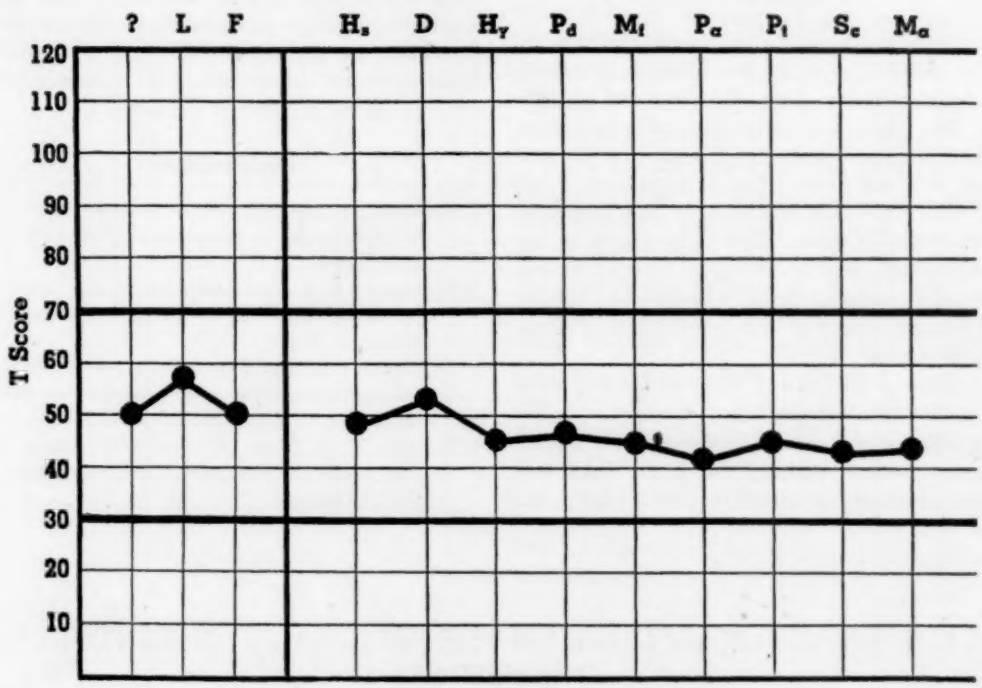

FIG. 2. (Case 25.)

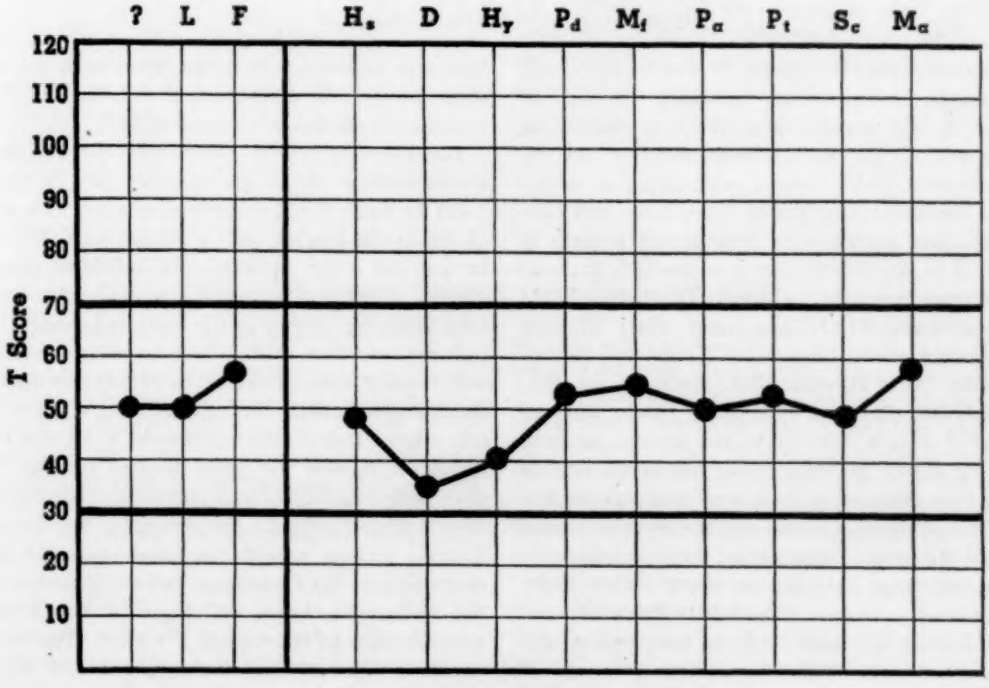

FIG. 3. (Case 26.)

SUMMARY

The Minnesota Personality Test was studied to determine its possible value in the selection of officers charged with combined duties of military and scientific nature. The relationship of the personality profiles of a series of 28 officers, studied over a period of one year or more, with this unusual type of assignment is correlated with their emotional stability and success in the performance of duties. Lack of adaptation or impairment of efficiency in the series reported is correlated under certain conditions with high Lie, Validity and Hypomanic scores as well as with general elevation of the scores.

High values of the Hy and Mf scores are frequently found in the series studied.

On the basis of this series it appears that if a normal personality curve is obtained, and if the stable performance of military personnel in a field where combined military and scientific efficiency is required, the Minnesota Inventory may provide an adjuvant screening device. As more data of the type here given are obtained, further refinements of the screening process will increase the precision of the method.

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THE EFFECT OF ALCOHOL ON THE PERSONALITY INVENTORY (MINNESOTA)

PRELIMINARY REPORT

HAROLD A. ABRAMSON, MAJOR, M. C.

By means of the "Multiphasic Personality Inventory" compiled by Hathaway and McKinley, the effect of alcohol on the personality profile was studied on twenty adults. The subjects were asked to sort the 550 test cards which cover a wide range of subject matter into three categories of *True, False,* and *Cannot Say*. The profiles were then plotted (Figure 1) according to the classifications now available for scoring: Cannot Say (?); Lie Score (L); Validity (F); Hypochondriasis (Hs); Depression (D); Hysteria (Hy); Psychopathic Personality (Pd); Masculinity-femininity (Mf); Paranoia (Pa); Psychasthenia (Pt); Schizophrenia (Sc); and Hypomania (Ma). After an interval of at least three weeks, the test was repeated, following alcohol ingestion, about half of the subjects having been informed of the general results of the first test. The conditions for studying the effect of alcohol were all the same. Usually three cocktails, each containing one oz. of whiskey, were drunk rather rapidly without food between 4:30 and 5:00 PM under conditions leading to a mild euphoria, talkativeness, and slight unsteadiness. When the classical symptoms of alcohol taken under these circumstances became evident, the second test was begun. The time required to complete the test was usually shorter after alcohol. This time was usually less than one hour, with the peak of the alcohol effects occurring during the test. Occasionally, the alcohol test was taken first.

The following briefly summarizes our analysis of the responses to the 22,200 questions thus far scored:

(a) In figure 1 is a curve representative of a group of ten of the twenty cases reported here. The continuous line is the profile for one individual obtained without alcohol. The dotted line represents the results following alcohol in the same individual. Note that not only does alcohol have no effect on the Lie and Validity score, but there is remarkable and unanticipated agreement between the sober and the alcohol values. Indeed, this agreement is all the more significant because the items selected for the "raw score" following alcohol were appreciably different from those without alcohol. For example, the curve in figure 1 without alcohol was based upon 151 items selected by the test for scoring. Following alcohol, only 116 items were chosen. Of these 116 items, but 84 were the same as the original 151 items. There were, therefore, 67 items that were omitted and 32 that were added. In other words, the nature of the personality profile was not only unchanged following alcohol, but also, the selection of a large group of

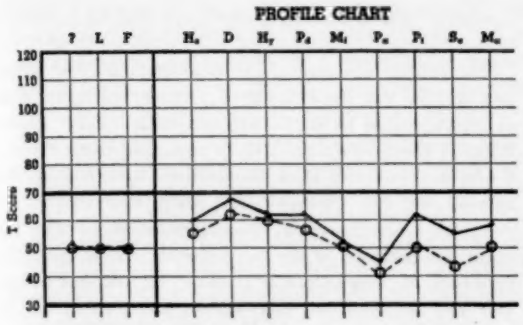

FIG. 1

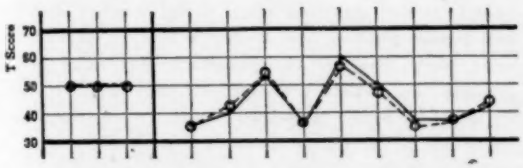

FIG. 2

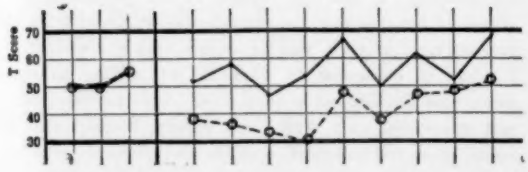

FIG. 3

FIGS. 1, 2 and 3.—The unbroken line is the profile before alcohol. The broken line represents the effect of alcohol on the test taken by the same individual after an interval of three weeks or more.

different items following alcohol did not sensibly change the profile. A similar general variation in items selected occurred in all twenty cases.

In figure 2, a similar comparison is given where the number of items chosen for scoring is significantly less.

(b) In the second group of cases (50% of the total), the general *shape* of the profile was the same following alcohol with the entire curve being shifted; or in other, certain variations were noted in particular categories. This is illustrated in figure 3.

The complete data and minute analysis of the individual responses will be published *in extenso* when conditions permit. It is planned to extend these analyses to the study of frank psychoneuroses including alcoholism. The study of the alcoholic patient by this method deserves special emphasis because of the objectiveness of the test and because the choice of questions in the inventory before and after alcohol may provide direct leads to the basic personality difficulties in alcoholism.

SUMMARY

Among normal adults it is often found in administering the Minnesota Multiphasic Personality Inventory that one expresses the same attitudes when under the influence of alcohol as when sober; sometimes there may be relative differences expressed, whereby the scoring in some categories may drop 20 or 25 points, but no radical differences have been encountered in twenty such experiments.

EIGHTH SERVICE COMMAND POSTGRADUATE MEDICAL EDUCATION

NEUROPSYCHIATRIC CASE REPORTS *

CASE NO. 4—NOVEMBER 1943

A 31-year-old married sergeant, with one year and three months service, transferred from a station hospital with a diagnosis of angioneurotic edema.

The patient was reared by his grandparents after his parents separated when he was four years old. They were kind and perhaps over-indulgent in some ways, but they left him to his own devices. His mother was also in the home, but did not have much time for him. "I have been on my own as long as I can remember." The patient's father was a musical comedy artist and a chronic alcoholic, who had deteriorated badly in recent years. During the patient's childhood his father had an international reputation as an original and talented singer and pianist, whose style had been imitated by others. The patient had no memories of his father before the separation of his parents. He had been told that his father had had a dress suit and top hat made for him and taken him on the stage. Between four and twelve years of age he did not see his father, who made several trips to Europe. When his father returned home he remarried the patient's mother, and showed a strong interest in his son. He tried to win his affection with liberality in the expenditure of money and attention. But the boy soon became disgusted and humiliated by his father's drunken misbehavior. The father was boisterous, nasty, and sarcastic while drinking, and unrestrained in his relationships with women. The patient found it unforgivable that his mother was not treated with the respect and faithfulness he felt was due her. From that time to the present he could find nothing good to say about his father. "Others found him charming; I thought he was disgusting."

When the patient left his home city he felt that he had

* Distributed to each medical officer of this command.

been forced to do so by the disgrace brought to him by his father's conduct. The patient admired his mother's talent as a dress designer. He did not hesitate to say that she was a flighty individual, who more or less ignored him during his childhood. In later life he lived close to her and his sister in California. He described his wife as a good-looking woman, formerly a model, not especially efficient as a housekeeper. She was strongly attached to their son, toward whom she apparently took an overprotective attitude. The boy suffered from asthma. The wife had migraine headaches with her menstrual periods.

The patient suffered from annual hay fever between the ages of twelve and eighteen. His eyes and nose were affected. The symptoms began in the spring and continued in attacks until fall. The symptoms disappeared when he left Texas in 1929. This fact led to the conclusion that the allergen involved was to be found exclusively in the Texas atmosphere. It is also worthy of note that the hay fever symptoms began at a time of emotional upheaval in the patient's life, when the conflicts of puberty were overlaid with the disturbing effects of his father's return and the remarriage with his mother, and ended when he separated himself from his father; "forced to leave home by my father's disgraceful behavior." In the ensuing four years he lived apart from his family. In this period he felt his independence strongly. He worked on a construction project, and decided that he wanted to become an engineer. In 1933 he joined his mother and sister in California.

Shortly after his arrival in California the patient took a job as bartender. He married soon after. Although he had frequently felt dissatisfaction with his failure to become an engineer, he had remained a bartender ever since. He had made 4 to 7 dollars a day. He felt security in the job. He drank a little every day, but had never drunk to excess. The patient made an art out of one aspect of his work: he was expert at handling "drunks." For those drinkers who lost control of themselves he felt a deep contempt, but did not show it.

The patient had an interest in guns, which went back to childhood. He owned his first rifle at eight years of age. He liked to repair guns. He was an aerial gunner in the Air Corps. His first station was in California, where he did patrol duty over the Pacific. In the fall of 1942, he was transferred to a Southern camp. In October, 1942, his first symptoms appeared. He developed a wheal on his back during target practice. Since then he had been hospitalized three times because of severe generalized angioneurotic edema. In addition to the nodes and wheals, disabling weakness of his ankles and shoulders appeared in the absence of swelling. He also had cramping of the small muscles of the hands, and suffered from recurrent severe headaches, which incapacitated him.

The patient felt perfectly satisfied with his rating of sergeant. His organization urged him to go to Ordnance Officer Candidate School, but he refused. He could think of many reasons why a sergeant was in a better position than a Second Lieutenant. He gave the impression that there was not the slightest doubt in his mind about the choice he wished to make. It was at the time that Officer Candidate School was being discussed that his symptoms began.

The patient was studied in consultation by the allergy section. He was found sensitive to many allergens, none of which seemed to be the adequate cause for the wheals. Repeated blood counts revealed an eosinophil count between 4 and 8. Numerous stool examinations were negative for parasites and ova. Gastrointestinal X-rays were normal.

At the beginning of the hospitalization there were frequent exacerbations of the angioneurotic edema, gradually decreasing in frequency and severity. He did not tolerate very well the numerous examinations and the lack of certainty of the doctors during his first weeks in the hospital, but gradually adapted himself to the necessary routine. His attitude toward the ward officer varied between deference and hostile rejection, the former a type of bribery, the latter based upon his disappointment over delay in the granting of a medical discharge. He independently sought the aid of his former regimental surgeon and the Commanding Officer of the hospital to obtain a quick disposition. No special medication was given for any complaints; since there were no straightforward anxiety symptoms he had no need for sedation. It was the opinion of the dermatologist in charge of his case that the exacerbations occurred when the patient was assigned routine duties which restricted his freedom of movement or when he was feeling frustrated concerning the disposition of his case. After four months he was transferred to a West Coast general hospital near his home, upon recommendation of the dermatologist, as a psychotherapeutic measure, in the expectation of increasing his insight into the psychological factors in his illness before a final disposition was made. It seems unlikely that this man will ever render useful active duty in the Army.

DISCUSSION

It can be stated from experience with other cases that the fact of the patient's having been reared by grandparents was an influence in his character development. Although he was indulged in petty matters, the atmosphere of the home lacked true warmth and understanding of a child's viewpoint, and the patient became prematurely "self-sufficient" and inadaptable. The father's return was a traumatic experience. We can speculate that the seductive behavior of this famous individual was confusing to the patient, and when the father's asocial tendencies became evident, the reaction was severe. The patient's current attitude of complete rejection of his father ("others find him charming; I think he is disgusting") was in part a reaction against strong feelings of affection for him which he must disavow since these feelings led to a childish dependent relationship which was not compatible with his independent self-sufficient image of himself. It is of interest that the patient's vocational accomplishments were so commonplace in contrast to the careers of his father and mother. There is evidence that the patient had succeeded in relieving guilt toward his father by guiding and befriending "drunks" in his work as a bartender. He felt contempt, but did not show it. He abandoned his original ambition to be an engineer. In the Army he similarly contented himself with a subordinate posi-

tion. He expressed unbounded self-confidence in his abilities as a gunner. He stated that he was cool and tough, and an able marksman. He was critical of many of his superior officers, believing they were unfit for their jobs. His statements carried an air of certainty. He admitted of no doubts or qualifications of his attitudes. He presented the picture of a self-sufficient, independent, competent individual, who had many effective techniques for impressing others in casual relationships. He was obviously sensitive to maintaining his prestige. Behind this rigid narcisstic defense, an unseen battle was being waged. We may speculate that the abandonment of an opportunity for promotion was accomplished only at a price. The blow to his prestige which was involved increased his need for belief in his self-sufficiency, and increased his competitive feelings and hostility toward his superiors, and consequently his guilt. The humanizing outlet which being a bartender provided for him was not available. Since he had, from childhood, expressed sublimated hostility through his interest in guns, the present need to use them directly for destruction may have put an increased strain upon him. The appearance of his disability signalized a regressive solution of the problem. The disability rationalized his wish to return home to his wife and to his mother. He sought the consolation of their love when his aspirations in a male society were frustrated.

Three other cases of urticaria were observed in consultation. One was a 24-year-old First Lieutenant with 1 year and 8 months' service, with symptoms of 5 months' duration. He was repeatedly separated from his parents as a child. His father and mother took long business trips, and the patient estimated he was separated from them one-third of his childhood. The parents were ambitious for their children. The patient's vocational attainments were less than the rest of the family; he had a rather ordinary job in the merchandizing of clothing. Two of his brothers were physicians. He worked hard in the Army, and went through Officer Candidate School. In discussing his case he showed a strong defensive attitude and exploited every evidence of accomplishment in the Army, no matter how ordinary or meager. He discussed in detail problems of Army organization, discipline, and leadership, but not always with the grasp that his attitude implied. He sought to demonstrate that his adjustment in all aspects of life was of a superior quality. In discussing his relationships with women he became less certain of himself and lost some of his self-assurance. He never developed a serious interest in any woman nor had he ever had sexual intercourse. He said, "The punishment is too great." He gave many rationalizations to support his attitude.

In this case, there is evidence of deprivation of love in childhood with early attitudes of independence. The patient's vocational accomplishments fell below the family standards. His character organization was superficially of a self-sufficient, ambitious, and exhibitionistic type. He feared intimate relationships with women and the interpretation is suggested that women were dangerous to him because of an unsatisfied longing for parental love which aroused immature dependent wishes. The ambitious strivings helped him compensate for the resultant feelings of inferiority. Since his ambitions had outrun his capabilities a neurotic conflict ensued. The urticaria provided a partial solution in the direction of invalidism as long as he could rigidly exclude any suggestion of the emotional causes of his illness. His efforts to demonstrate that food allergy was the sole cause of his symptoms consumed a great part of his energy.

The third case was a 38-year-old Lieutenant. His father was an ordained elder of the Methodist Church who was away from home most of the time, returning for short visits. The patient, who was the seventh of thirteen children, believed he was his father's favorite, and beginning at 2 or 3 years of age he often traveled with him. By the time he was 8 years old he took train trips of 100 miles by himself. His mother "encouraged independence." As a child he worked in a store and earned money to buy his first suit of clothes. At 13 years of age he left home for boarding school, graduating 3½ years later. He had held many different jobs, including social work, teaching, and newspaper writing. He preached his first sermon at 28 years of age. He had held the position of an affiliated pastor, but had never had his own church. He was not ordained until 1941, while his brother had had his own church since 1935. He stated that he had gone out with many girls, but avoided marriage until he was 34 years old. Prior to marriage he had sexual relationships occasionally, but only if the woman took the initiative. He served in the Army as a sergeant without symptoms. He was discharged on the grounds of being an ordained minister, and the onset of his symptoms coincided with his re-entry into the service as a commissioned officer. Examination disclosed that he was facile with words, condescending, and expansive, frequently making use of evasion and misstatement to justify his position. He laid great emphasis on his superiority of performance and the maintenance of an impeccable reputation. He denied all emotional conflicts, but later stated that racial segregation in the South was a source of severe concern to him. It was apparent that his high self-evaluation could not be supported by the history of his accomplishments.

The fourth case, a 23-year-old corporal, with 11 months' service, gave a history of a satisfactory Army record until the eighth month of service, when the first attack of urticaria followed his dropping out of a long march because of a pain in the side. He was on limited duty because of a hernia which he had repeatedly failed to have repaired. Shortly before his induction his mother became bedridden with carcinoma. Her death was long anticipated, and the patient had received two emergency furloughs when the family thought erroneously that she was about to die. She died five days after the first appearance of the urticaria; during his third emergency furlough to attend the funeral the urticaria cleared. He believed he took his mother's death "very well," and wept only at the funeral. "I felt relieved that she was no longer suffering," he said. Afterwards, he avoided thinking about his loss. On his return to his organization the urticaria returned. History revealed a close family attachment with an attitude of strong admiration for both his parents. His mother was strict, and occasionally used a strap; his father was easy-going with the children, indulging them whenever his own comfort was not involved. The patient stated, "I was always dependent on myself," and told of selling strawberries as a child to earn pocket-money.

He left high school against his mother's wishes, working on a friend's apple farm and doing odd jobs. He was interested in operating motion picture projectors. His ambition in the Army was to be an aerial gunner. When interviewed he felt he could not tolerate going back to his organization because he wanted to go overseas or at least see new places, and because his pride was hurt by the slighting remarks about the number of emergency furloughs he had obtained. He presented a strong defense against recognition of grief at his mother's recent death. He smiled frequently and sought to picture himself as an ideal soldier, devoted to his duty, who got along well with everybody.

In each of the four cases evidence is found of: (1) early "independence" reactions; (2) ambitious expectations by the parents, especially the mother; (3) a less strict or even seductive father; (4) a level of achievement below the family standard in adult life; (5) narcissistic self over-evaluation with extreme sensitivity and defensiveness; (6) fear of women or a dependent attitude toward them; (7) exhibitionistic vocational activities; and (8) a lack of warmth and affection in the early home environment.

Two cases of urticaria in women have been studied by Saul.[1] He reports the central feature was deprivation of parental, but primarily of maternal love, in childhood with consequent increase in longing for paternal love with a masochistic coloring. The attacks of generalized urticaria occurred regularly and exclusively when the patient's wishes for love were intensified and frustrated. The longings for love were expressed in dreams largely in the form of wishes to be admired, to be beautiful, and to have fine clothes. Both patients wanted to be dancers; the first acted in amateur theatricals and the second modeled for artists.

[1] Weiss, E. and English, O. S.: *Psychosomatic Medicine.* Philadelphia, W. B. Saunders Co., 1943, p. 498.

SUMMARY

Psychiatric examination of a case of urticaria seen in consultation revealed deprivation of love in childhood, with premature attitudes of self-sufficiency and independence. The adult character organization showed strong narcissistic defenses against passive dependence on women. Father figures were depreciated and the patient exaggerated his own talents and accomplishments, although his vocational choice was below the family standard. The urticaria appeared when conflict over promotion threatened his self-confidence and increased his longing for the security of home.

Three other consultation cases are discussed briefly with a formulation of possible common features.

REGIONAL MEETING OF THE AMERICAN SOCIETY FOR RESEARCH IN PSYCHOSOMATIC PROBLEMS, MAY 11, 1945

THE NEW YORK ACADEMY OF MEDICINE, 2 EAST 103 STREET, NEW YORY CITY

9:30 A.M.

Techniques of Brief Psychotherapy

Chairman: Carl A. L. Binger, M.D.

Individual Psychotherapy ..... Franz Alexander, M.D.
Narcotherapy ..... Paul Hoch, M.D.
Hypnotherapy ..... Margaret Brenman, Ph.D.
Merton Gill, M.D.
Group Psychotherapy ..... Robert G. Heath, M.D.
Nathan W. Ackerman, M.D.

2:00 P.M.

Symposium on Peptic Ulcer

Chairman: David Barr, M.D.

Pathological Physiology ..... Harold Wolff, M.D.
Clinical Management ..... Chester M. Jones, M.D.
Psychiatric Management ..... Lt. Comnder, Leon Saul (M.C., U.S.N.)

Proceedings of this meeting will be published in full or in abstract form in the journal, PSYCHOSOMATIC MEDICINE

American Society for Research in Psychosomatic Problems
714 Madison Avenue, New York 21, N. Y. REgent 7-0796

REVIEWS OF PERIODICAL LITERATURE

WENDKOS, MAJOR MARTIN H.: *The Influence of Autonomic Imbalance on the Human Electrocardiogram. I. Unstable T Waves in Precordial Leads from Emotionally Unstable Persons without Organic Heart Disease.* Am. Heart J., **28**:549, 1944.

In this introductory paper, the author is able to demonstrate that, when emotional instability exists, any resultant preponderance of cholinergic or adrenergic stimuli usually exerts a modifying influence upon the electromotive forces responsible for the ventricular deflection in the human electrocardiogram. The evidence to support this view consists in the T wave alterations produced by drugs or procedures which augment or suppress the activity of either of the components of the autonomic nervous system. For instance, an aberration of this deflection, when exaggerated by a sympatheticolytic drug and abolished by parasympatheticolytic or sympatheticomimetic drugs or by the assumption of the upright position was ascribed to hypervagotonia, whereas, conversely, a bizarre T wave which was normalized by a sympatheticolytic drug and made increasingly abnormal by orthostatism, or sympatheticomimetic and parasympatheticolytic drugs, was attributed to hypersympatheticotonia. Also, under circumstances when the T wave was not distorted in a routine record, a "latent" state of vagal preponderance was identified by the abnormalization of this deflection which resulted from the administration of a sympatheticolytic drug, and by analogy a "latent" state of sympathetic preponderance was established by an abnormal response to parasympatheticolytic and sympatheticomimetic drugs and procedures. It is the opinion of the author that these testing methods offer, for the first time, a simple, harmless and dependable means for the study of disturbed homeostasis of the autonomic nervous system in man. For this reason he considers that these methods of appraisal of T wave modifications in the human electrocardiogram should prove to be useful in the diagnosis of various functional disorders. In the routine survey of patients with cardiac disturbances, he believes that they should have an especially practical application because the information thus provided will enable the physician to distinguish significant electrocardiographic abnormalities due to neurogenic factors from those which are produced by structural disease within the heart itself. In the investigations which form the basis of this report, no attempt was made to correlate the type of changes in the ventricular deflection with definite neurotic patterns or constellations but it is implied that in future studies this aspect of the subject will receive greater attention.

Author's Abstract

MERRILL, BRUCE R.: *Psychogenic "Malaria."* Nav. Med. Bull., **44**:69, 1945.

Cases of psychic malaria among marines are discussed. In each instance benign tertiary malaria had been contracted in the South Pacific, and in each case the malaria had run a refractory course with numerous remissions and recurrences. The patients were psychologically attuned to frequent true malarial chills. Typically, these patients have a "chill" on entering hospital strikingly similar to the malarial chill but with no elevation of temperature. They have chattering teeth, generalized shaking which rocks the bed, rapid pulse and respiration. Repeated tests of the peripheral blood reveal no plasmodia.

Psychologic investigation reveals fundamental conflict with authority, resentment of regimentation. It is emphasized that malaria diagnosis obscured the psychogenic factors so that psychotherapy was not instituted at the optimum time. (F.V.L.)

MOSCHCOWITZ, ELI, AND BERNSTEIN, SOLON: *The Relation of Neurocirculatory Asthenia to Graves' Disease.* Am. Heart J., **28**:177, 1944.

The authors are of the opinion that neurocirculatory asthenia, which at various times has been called "effort syndrome," "soldier's heart," "autonomic imbalance" and "Da Costa's syndrome," presents so many features in common with the larval or constitutional phase of Graves' syndrome that they believe the two are identical. Symptoms that the two diseases have in common include breathlessness, palpitation, dizziness, occasional procordial pain, sighing, headache, dry mouth, occasional syncope and diarrhea. Usually there is anorexia. The characteristic physical signs of neurasthenia are tachycardia, coldness of the hands, hyperpnea, tremor, sweating of the palms and axillae, asthenia and dermographia. Neurasthenia is extremely common in civil life as well as in the military forces. Also the constitutional factors of neurocirculatory asthenia parallel those of Graves' disease closely. Fear seems to be the dominating etiological factor, and it is well known that an emotional crisis may precipitate an attack of Graves' syndrome. Because the basal metabolism is usually elevated in Graves' syndrome, one is not warranted in concluding that the patient does not have Graves' syndrome merely because his

basal metabolic rate is not elevated. There are borderline cases in which the basal metabolic rate is normal. Iodine has been found useless in neurocirculatory asthenia, and likewise in Graves' syndrome, without hyperthyroidism. Eleven cases are reported in detail to illustrate the transition of neurocirculatory asthenia to Graves' disease, and vice versa. (F.V.L.)

COBB, STANLEY: *Review of Neuropsychiatry for 1944.* Arch. Int. Med., **75**:65, 1945.

Dr. Cobb begins his annual summary with a review of some war neurosis literature which is already familiar. He takes the opportunity, however, to complain feelingly about terminology, arbitrary distinctions between neurosis and psychosis and the like. He discusses experimental neurosis, emphasizing H. W. Gantt's book "Experimental Basis for Neurotic Behavior" and H. S. Liddell's work in Hunt's book "Personality and the Behavior Disorders." In discussing canine experimental neurosis he notes the interesting sexual reflexes which developed in the subjected animal, erections and ejaculations precipitated in the dog by the disturbing laboratory situation. In neurology, the author emphasizes the increased understanding of brain metabolism which has resulted specially from studies of oxygen uptake. (F.V.L.)

KOPELOFF, N., BARRERA, S. E. AND KOPELOFF, L. M.: *Experimental Chronic "Epilepsy" in the Baboon and Epileptiform Seizures in the Dog, Rabbit and Guinea Pig.* Am. J. Psychiat. **101**:201, 1944.

Experimental chronic "epilepsy" has been produced in the baboon and African green monkey by a single application of alumina cream to the motor cortex. After a clinically free period, reactions first occurred 7 weeks and 3 months, respectively, after operation. These observations parallel the results obtained previously in a large series of rhesus monkeys.

Rabbits similarly treated reacted 3-4 weeks after operation with acute convulsive attacks of short duration.

Recurrent epileptiform seizures were induced in the guinea pig following an intracerebral injection of the same material. The convulsive pattern differed from that observed in the primates. Dogs and cats failed to respond to the cerebral application of alumina cream. However alumina A caused immediate accute convulsions in dogs but produced no seizures in cats. (F.V.L.)

LURIE, LOUIS A: *The Endocrine Factor in Homosexuality: Report of Treatment of Four Cases with Androgen Hormone.* Am. J. Med. Sc., **208**: 176, 1944.

Four cases of innate homosexuality are presented and the need for psychosomatic approach stressed in understanding these cases. In 3 cases structural and functional changes and development of normal masculine attitudes were brought about by treatment with testosterone propionate. In the fourth case treated with androgen hormone, homosexual tendencies were converted into normal heterosexual trends. The endocrine factor in causing this condition when it is innate and not acquired is emphasized. (F.V.L.)

ROSENBERG, RALPH: *Heredity in the Functional Psychoses.* Am. J. Psych.,**101**:157, 1944.

The author notes four methods in study of this topic. The first three are Galton's family history, Mendelian and a combination of the two. He shows these methods to be inapplicable. The fourth method is the study of the mental status of twins. Although the heredity is the same in identical twins, the mere discovery of the same mental disorder in twins does not prove the disorder to be hereditary. That twins are more likely to have the same kind of environment and similarity of environment seems to be the true cause. If heredity were the cause of psychosis it would be impossible for one twin to be affected. Yet in a study of 41 pairs of identical twins only one twin was affected in 32% of the pairs. The author advances these findings as substantial evidence against hereditary etiology. (F.V.L.)

BOOK REVIEWS

Manual of Military Neuropsychiatry. Edited by Harry C. Solomon and Paul I. Yakolev. Philadelphia, W. B. Saunders Co., 1944, 764 pp. $6.00.

This manual is a reference text on topics of clinical neurology and psychiatry. It has been prepared for medical officers who may have to work in areas where libraries, textbooks and professional facilities are unavailable. The introduction summarizes the psychiatric experience of the first World War. It also contains an extensive study of the procedures of the induction examination, which forms the basis of all later military psychiatry. Even more emphasis could have been put on the function of the induction board psychiatrist, his personality, qualifications, the influence of the tiring routine and the necessity for a cooperative relationship with the other members of the board.

Part III contains the essential details of psychiatric administration and is followed in Part IV by an outline of "Clinical Entities." Abraham Meyerson's short paper on "Malingering" deserves special attention because of its understanding approach. It cannot be stated too strongly and fre-

quently how often the diagnosis of malingering is an expression of the doctor's own conflict.

"Prophylaxis and Therapy" form Part V and is followed by a collection of "Special Topics." The chapter on "Group Psychotherapy" is not quite up to date and is academic. Reconditioning and rehabilitation, two topics which deserve as much space and consideration as the induction examination, are mentioned too briefly.

This book as a manual of military neuropsychiatry is of outstanding quality and contains answers to many of the problems of the psychiatrist in the services.

E. GROTJAHN

KLUCKHORN, CLYDE: *Navaho Witchcraft.* Papers of the Peabody Museum of American Archaeology and Ethnology. Harvard University, Vol. XXII, No. 2. Cambridge, Peabody Museum, 1944.

Fortunately the questions cultural and social anthropologists ask are becoming more and more significant in terms of an understanding of modern society—an understanding that is so badly needed. In the work under review Kluckhorn has taken as subject matter Navaho witchcraft. Instead of stopping with an ethnological description of witchcraft among the Navaho he has asked the question: What is the place of witchcraft in the general operation of Navaho society? Emphasis is "focussed upon the structural dynamics: on the one hand, the actual value of contemporary Navaho witchcraft beliefs and practices for the preservation of the equilibrium of Navaho Society and its component individuals, on the other hand, the 'cost'—the disruptive effects—of such beliefs and practices."

In the first section the author presents the data on the practices and beliefs centering around witchcraft. In the second section he gives his interpretations of the data, first from the viewpoint of history and distribution, and then from a psychological viewpoint. It is the latter part of the monograph that should be of particular interest to readers of this Journal. For here, Kluckhorn is interested in Navaho witchcraft "as providing culturally defined adaptive and adjustive responses." He asks, among other questions, "Why have witchcraft patterns (whatever their historical source!) survived through the periods to which our material relates?" Kluckhorn looks for an answer, partial at least, in the socialization process and Navaho childhood experiences. In regard to the "latent," rather than "manifest," functions of Navaho witchcraft the author sums up by saying: "Witchcraft is a major Navaho instrument for dealing with aggression and anxiety. It permits some anxiety and some malicious destructiveness to be expressed directly with a minimum of punishment to the aggressor. Still more anxiety and aggression is displaced through the witchcraft pattern assemblage into channels where they are relatively harmless or where, at least, there are available patterns for adjusting the individuals to the new problems created. Individual adjustment merges with group adaptation." Kluckhorn makes a good case for his hunch that witchcraft in Navaho culture is a "substitute" for race prejudice.

Kluckhorn deals almost exclusively with the functions of witchcraft from the viewpoint of the victim, or the one who thinks he is being victimized. The problem also is interesting from the viewpoint of the witch, in terms of adjustment for the society and the individual. Kluckhorn points out the kinds of individuals who are accused of witchcraft. Interestingly these are the very people who, like the aged, might really have hostility, or who might have hostility projected on them, like the rich, and might have anxiety on that account.

It struck this reviewer that Kluckhorn could have strengthened his interpretations by dealing more in terms of what Kardiner calls the "projective system." For instance, Kluckhorn speaks of Navaho mythology and general cultural ideology stressing capricious and malevolent forces in the world to which the individual reacts. But these very ideas *are an outlet for anxiety,* as well as a creator of anxiety. The author uses Murray's terms, *alpha press* and *beta press,* in his discussion of the point, which to this reviewer seems to confuse more than it clarifies when used in this particular context.

We need more studies like the present one under review. Such studies give us understanding of process in culture; of the uses to which individuals put the cultural material at their disposal; and of the whole problem of continuity in culture. It is only in this way that we can understand the processes at work in our own particular culture.

SCUDDER MEKEEL

CRIEP, LEO H.: *Essentials of Allergy.* Philadelphia, J. B. Lippincott, 1945, 381 pp. $5.00.

The author, a specialist in medicine with interest and experience in allergic conditions has written a concise and fairly complete outline of allergy. The theoretical fundamentals, their practical application, and the therapeutic conclusions are as well covered as are definitions of terms, nomenclature and case histories. A student or physician needing orientation in the field of allergic phenomena will be well satisfied with Dr. Criep's publication which contains the optimal dose of known facts. A special discussion of skin tests used for diagnostic purposes in clinical medicine is appropriately included.

Those physicians who feel that allergic phenomena are, in many instances, mainly due to psychic influences will be somewhat disappointed in the cursory manner in which the author has touched upon psychosomatic problems. The few hints given under "General Therapeutic Measures" with three illustrative case reports do not do justice to the tremendous importance of psychogenic factors in the appearance and disappearance of allergic symptoms. If one only considers the frequency with which one of the most serious allergic conditions, bronchial asthma, defies every attempt to establish a specific allergen responsible for the attacks, one should hope to find a candid admission that the present knowledge of allergic phenomena is incomplete.

A greater emphasis on psychological factors and psychotherapy seems therefore as justified as the meticulous enumeration of huge batteries of skin tests or elimination diets which may possibly act only via psychic pathways rather than by specific desensitization.

This criticism does not detract from the value of the book as a primer in allergy, but, as in many other fields, the

happy balance between the "scientific" and "psychosomatic" attitude has still to be established.

K. E. LANDÉ

SOKOLOFF, BORIS: *The Civilized Diseases.* New York, Howell, Soskin, 1944, 309 pp. $2.00.

This well written book is really a kind of introduction for the lay public to modern medicine and its problem. By an intelligent and careful approach the reader is guided through the maze of present-day internal medicine. In stressing the influence of certain factors innate in our western civilization and habits of living, in emphasizing the importance of dietary measures and of psychological factors, a positive, optimistic attitude towards diseases is sustained. Case histories support the author's discussions. Dr. Sokoloff succeeds in inspiring confidence in modern methods of diagnosis and treatment.

If one considers popularization of the medical sciences a desirable aim one has to admit that this book represents one of the better attempts to accomplish such a purpose. Those who believe that popularization only breeds ignorance and hypochondria will disagree. However, it seems to the reviewer, that the tenor of the whole book is such that perhaps a few readers will be induced to consult their physician in time for cure of a carcinoma or for some other form of modern treatment, instead of coasting along or seeing a chiropractor. In other words, if people want to learn about their ailments, Dr. Sokoloff has given them a handy tool to do so.

K. E. LANDÉ

KLEIN, DAVID BALLIN: *Mental Hygiene; the Psychology of Personal Adjustment.* New York, Henry Holt Co., 1944, 511 pp. $4.00.

The attempt to cover thoroughly the fields of psychopathology, clinical psychiatry, education, prophylaxis, and the program of "positive mental hygiene" all in one volume, is too ambitious a project. The result is that the book is decidedly uneven in quality, with some sections, notably on clinical psychiatry, falling far below others. The recurrent emphasis on prevention and the need to work out "techniques of better living for all of us and not merely those who are potentially threatened by the specter of "mental disease" is excellent.

Some of the writing has a trenchant fiery quality, particularly with reference to one aspect of mental hygiene which one rarely finds even mentioned, though we are all dimly aware of its importance. He writes: "For about 70% of American families the security in which wholesome family life should live, move and have its being is either nonexistent or, at best, uncertain. All along the line—in matters of health, of longevity, of housing, of education, and of judicial protection—this security is menaced. In the light of what has already been said concerning the importance of emotional and other kinds of domestic security for the achievement of balance and self-assurance and personality integration for growing children, it ought to be obvious that grave mental hygiene issues are bound up with the relative poverty of more than two-thirds of American families. These are issues with which professional mental hygienists cannot cope." The psychiatrist aware of his role in society, cannot escape the implications of these truths.

There are passing references to the role of psychosomatic medicine, a subject which is rather inadequately presented.

H. F. LANDER

BARTON, BETSY: *And Now to Live Again.* New York, D. Appleton Century, 1944, 150 pp. $1.75.

This book was written as a guide for those who have been seriously disabled through injury, disease or war. The author herself experienced a severe injury to her spine in an automobile accident 10 years ago, resulting in paralysis of her legs. Although the book is not autobiographical the author relates many of her own experiences in the long difficult struggle from complete invalidism, both physical and emotional, back to a life of health and happiness.

Much of the book is written in very general terms; often it becomes philosophical, and the latter part particularly has a strong religious note. Nevertheless, the author has expressed in simple terms certain fundamental psychological facts relating to the problem of illness, convalescence and rehabilitation. First of all she emphasizes the fact that all people react emotionally to injury and disease and that in the rehabilitation program the entire person, not just the paralyzed limb or blinded eye must be treated. Unless the "rescue work" or emotional rehabilitation takes place early, Miss Barton points out how the "mind retreats and hides and withdraws from the painful points of contact with reality." Essentially the author is stating that illness fosters regression and dependence. With this in mind, the need to return the disabled person as quickly as possible to normal living and independence is stressed: just as a soldier suffering from an acute traumatic neurosis of war should be given immediate treatment and returned to fighting as soon as possible. In order to accomplish this Miss Barton envisages the establishment in the large cities of Centers as way-stations between the hospital and the home for the re-education of the person who is disabled.

OTHILDA KRUG-BRADY

KARNOSH, LOUIS J., and GAGE, EDITH B.: *Psychiatry for Nurses.* St. Louis, C. V. Moseby Co., 1944, 339 pp. $2.75.

The content of this book reflects the authors' thorough understanding of the needs of the student nurse during her course in psychiatry. From beginning to end they adhere to the fundamental and important principle stated in the preface of the need for emphasizing "the basic elements of psychiatry in as concrete and practical a manner as possible."

While the general organization, illustrations, case histories, and subject matter remain essentially the same as the first edition, there are several timely additions. The latter include a brief introduction to the concept of psychosomatic medicine, information about tests employed in evaluating personality traits, intellectual capacity and various types of performance, uses of electroencephalography, a discussion of psychosurgery as treatment in involutional melancholia, and a section on electric shock therapy. The references and ques-

tions at the end of each chapter have been enlarged and brought up to date.

This book, clearly and comprehensively written, is recommended as being of value either as a text or reference book for use by student nurses and should be included in libraries of schools of nursing.

MARGARET C. KELLEHER

STRECKER, EDWARD A.: *Fundamentals of Psychiatry.* 2nd Edition. Philadelphia, J. B. Lippincott Co., 1944, 219 pp. $3.00.

This is a brief and condensed book which comprises the author's teaching material to medical students in the field of clinical psychiatry. The classical psychiatric syndromes are presented clearly and succintly. However, there is only one short paragraph on psychosomatic medicine.

Although psychoanalytical concepts and principles are pretty much avoided, the author makes the following statement when discussing the various etiological concepts of anxiety neuroses: "He (Freud) feels that anxiety neuroses are more frequent in women and are due to coitus interruptus or ejaculatio precox; in men to sexual excitement, coitus interruptus and senile conditions—" For one reason or another the author fails to mention either the historical setting of this statement or Freud's later formulation of the problem of anxiety. The book contains a psychiatric glossary which will be helpful to students.

MILTON ROSENBAUM

W. F. NORWOOD: *Medical Education in the United States before the Civil War.* Philadelphia, University of Pennsylvania Press, 1944, 503 pp. $6.00.

This panorama of medical schools in the United States prior to 1860 deals not only with the famous "first" schools (University of Pennsylvania School of Medicine, College of Physicians and Surgeons of Columbia College, New York, Medical School of Harvard University, etc.). It also carefully studies the history of the dozens of medical schools, now merged or disappeared, which once played a considerable rôle in medical education in the United States like the rural schools of New England and New York, the schools of the old South and West. The author has brought together the wide-spread, extensive material, already detected by local medical historians, and unearthed himself a great number of significant documents. He has thus given a reliable and valuable collection of the existing data. With the impartiality of the true historian, the author does not hide from us the sometimes rather low standards of many of the schools described.

The wealth of material to be compressed into one volume made it impossible for the author to give the more general, cultural background of his special subject. In the field of medical education the material seems to yield more data on the non-medical aspects of school life (fees, buildings, personal composition of and quarrels within the faculties) than on medical education proper. Data are here mostly limited facilities for dissections and bed-side instruction. In this respect, one would like to have more information of the kind contained in the short chapter on "The Curriculum, Textbooks, and Teaching Problems." But historical records unfortunately are usually not composed in view of the needs of the future historian.

ERWIN H. ACKERKNECHT

HENRY, JULES, AND HENRY, ZUNIA: *Doll Play of the Pilaga Indian Children.* New York, American Orthopsychiatric Association Inc., Research Monograph No. 4, 1944, 132 pp. $3.00.

This slim volume represents a year's field work pursued by the Henrys among a poor Indian tribe living in the Gran Chaco of Argentina. It consists of observations, experimental data and analyses of data with especial reference to hostility and, secondarily, to sexuality. In addition to observations of spontaneous play, experimental data are gathered by observing play situations created more or less artificially with the use of dolls. The method of experiment follows that outlined by David Levy in his "Sibling Rivalry." The authors found only 15 of the 34 forms of hostility given by Levy, but they conclude "that the patterns of behavior in sibling rivalry among . . . . (Pilaga children) follow with little difference those found among children in our own society." Fear of retaliation seemed to be the prime factor in the control of hostility. Remorse and self-punishment were found infrequently. Sexuality was regarded as another form of hostility with confusion of libidinal and aggressive components.

The material appears to be accurate, and it is extremely readable. Its value lies largely in the example it affords of the application of a psychoanalytic therapeutic technique (D. Levy) to an anthropological study. One cannot help but note that the work would have been much improved if the authors were as well versed in clinical psychoanalysis as they are in anthropology, since much pertinent data in the protocols (which seem to be merely appended) is omitted from the discussion.

While the monograph deserves praise as a pioneer study and may have additional significance in re-affirming the unity of psychology and biology, it has no direct bearing on psychosomatic medicine. For those with broader interests along these lines, it is well worth reading.

SAMUEL R. LEHRMAN

BOOK NOTES

CRUTCHER, HESTER B.: *Foster Home Care for Mental Patients.* New York, Commonwealth Fund, 1944, 205 pp. $2.00.

The care of selected mentally ill or mentally defective patients by families other than their own is discussed thoroughly and interestingly. Such placement of patients properly chosen from the state hospital population is highly desirable from many points of view. It gives the patient an opportunity to escape the utter sterility and barrenness which characterize most such institutions. Another advantage of the system is that it releases hospital space for patients requiring treatment in institutions.

Of considerable interest is the fact that the innumerable somatic complaints with which the in-patient is preoccupied constitute a very trivial problem when he is placed in an

environment where his creative energy finds other areas for investment.

H. F. LANDER

RICHARD, ESTHER L.: *Introduction to Psychobiology and Psychiatry*, St. Louis, C. V. Mosby, 1941, 357 pp.

Written as an abstract of lecture material presented to undergraduate nurses over the course of 22 years, this volume tends to be a sketchy and dogmatic but nevertheless authentic presentation of the vocabulary, methods and nosology of psychobiology. There is ample clinical illustration of the text and numerous practical and helpful suggestions to nurses. Its usefulness lies in the devoted and conscientious presentation by the author of the views of the Meyerian school of psychiatry.

H. M. SEROTA

TREDGOLD, A. F.: *Manual of Psychological Medicine*, Baltimore, Williams and Wilkins, 1943, 298 pp.

The author has intended this condensation of a classical psychiatric text for "civilian practitioners, members of medical recruiting and pension boards, and medical officers in the forces" as a "short, plain and practical account" of the field of psychological medicine. Viewed as such, the book fulfills an emergency wartime need as it is readable and presented with the force of an authoritative pedagogue. This very same authoritative and undocumented presentation of debatable material is also a source of misinformation seriously to be reckoned with. In this category belongs the persistent emphasis on heredity and constitution as casual factors of mental illness. Dynamic factors are given scant and negligible treatment, and as a corollary, psychoanalysis is regarded as a method of treatment that is "very questionable." Of its contribution to the understanding of mental illness, the author states, "Unfortunately Freud seems to have been obsessed by sex." One other major defect of this brief account of the field is the complete lack of clinical histories to illustrate the otherwise painstaking definitions of the various clinical entities.

H. M. SEROTA

BEST, C. H., and TAYLOR, N. B.: *The Living Body*, New York, Henry Holt Co., 1944, 571 pp.

This book is written as a simplified text in human physiology for the college student and others wishing a "bird's eye" view of the field. Because it culls a field so adequately presented in the more encyclopedic work of these authors, the book is readable, accurate and an up-to-date presentation. The authors are particularly adept in their choice of illustrative diagrams and photographs, many of which are original, and all of which are exceptionally lucid. The nature of the experimental evidence and the controversies surrounding them are omitted in favor of unequivocal statements regarding certain physiological phenomena. Thus, the prime value of this book to readers interested in psychosomatic medicine is that of an authoritative dictionary of physiology.

H. M. SEROTA

PSYCHODRAMA MONOGRAPHS.

No. 9. HENDRY, CHARLES E., LIPPITT, RONALD, AND ZANDER, ALVIN: Reality Practice as Educational Method. New York, Beacon House, 1944, 36 pp., $1.50.

No. 10. SHOOBS, NAHUM E.: Psychodrama in the Schools. New York, Beacon House, 1944, 19 pp., $1.50.

No. 12. TOEMAN, ZERKA: Role Analysis and Audience Structure. New York, Beacon House, 1944, 19 pp., $1.25.

Psychodrama, as originated by J. L. Moreno, combines the age-old means of the theatre with modern interpretive technique. Although still in its experimental stage, psychodrama is a new and interesting form of group psychotheraphy.

MARTIN GROTJAHN

BOOKS RECEIVED

ABRAMSON, DAVID I.: *Vascular Responses in the Extremities of Man*. Chicago, University of Chicago Press, 1944, 412 pp. $5.00.

BINGER, CARL: *The Doctor's Job*. New York, W. W. Norton & Company, 1945, 243 pp. $3.00.

DEUTSCH, HELENE: *The Psychology of Women, A Psychoanalytic Interpretation*. Vol. 1. New York, Grune & Stratton, 1944, 400 pp. $4.50.

HENRY, CHARLES E.: *Electroencephalograms of Normal Children*. Washington, Society for Research in Child Development, Vol. IX, No. 3, 1945, 71 pp. $1.50.

LINTON, RALPH: *The Cultural Background of Personality*. New York, Appleton-Century Company, 1945, 176 pp. $1.50.

MAYOR'S COMMITTEE ON MARIHUANA: *Marihuana Problems in the City of New York*. Lancaster, Pa., The Jaques Cattell Press, 1944, 220 pp. $2.50.

SELLING, LOWELL S., and FERRARO, MARY A.: *The Psychology of Diet and Nutrition*. New York, 1945, W. W. Norton & Company, 192 pp. $2.75.

WECHSLER, I. S.: *The Neurologist's Point of View*. New York, L. B. Fischer, 1945, 251 pp. $3.00.

IDENTIFICATION MECHANISMS IN CORONARY OCCLUSION *

JACOB A. ARLOW, M.D.

The occurrence of a definite personality type in patients with coronary artery disease has long been recognized. The figure of the enterprising individual driving hard toward the top of his professional or business field has been noted by both physician and author. It remained for Dunbar, however, to give a more precise delineation of this personality type and his focal conflicts. Only a brief summary of the personality profile will be given here, and in doing so the genetic aspects of its elaboration will be emphasized.

The usual story of the patient with coronary artery disease is that of a stubborn, self-willed child, who early entered into competitive relationship with a much feared and envied parent. (Occasionally the child may appear superficially acquiescent.) The conflict was then repressed and an identification made with this parent. Through hard work, self discipline, and compulsive devotion to the termination of the task which he assigns to himself, the patient keeps driving himself to success. In his work relations success means at least equalling his superiors, and surpassing and dominating others. A masochistic trend may be noted in the manner in which these patients neglect themselves and make themselves martyrs to their own ideals. Superficially these patients appear thoroughly outgoing and self-reliant. They make their own decisions, dislike to share responsibility with others, and are articulate and definitive about their feelings. Such patients may tend to brood but they keep their anxiety or depression to themselves, attempting to master their problems with compulsive asceticism and renewed hard work (4).

In surveying this profile from the point of view of dynamic psychology, one is impressed by the fact, that while this personality pattern may be extremely rewarding from the social standpoint, it offers the individual little happiness and solves few of his problems in a satisfactory manner. The compulsive striving for achievement and mastery never seems to end. Success does not bring with it a sense of gratification or any relief from tension. The individual is constantly drawn into new situations where he recreates again and again the original situation of competition, a situation which he attempted to master by identifying himself with his superior. Neither in the psychic nor in the somatic sphere is the patient ever at peace. The characteristic defense mechanisms of repression and identification serve their purposes only incompletely. The focal conflict with authority cannot be said to have been repressed successfully, because the patient keeps re-experiencing it in many and renewed forms. Identification with his feared and envied parent, apparently, has not solved this problem. Dunbar noted this contradiction when she stated: "Coronary patients are remarkable in the apparent strength and extreme brittleness of their defenses" (5).

The purpose of this communication is to study why these adaptive mechanisms fail. Having ascertained this, we should be in a position to account for the compulsive quality of the coronary patient's efforts.

The material for this study consists of an analysis of 13 cases of coronary occlusion, serially admitted to the Medical Wards of the Presbyterian Hospital. In addition to the psychiatric study, projective methods were used: notably the Rorschach Test. The conclusions reached are based upon only 9 of these cases; the remaining 4 cases were omitted, either because the material was insufficient (2 cases), or because the dynamic formulations outlined above did not apply (2 cases). Limitations of time do not permit the presentation of more than seven cases, and these, from the psychiatric point of view, will be fairly skeletal.

CASE NO. 1

M. Z. (No. 742948), a 41-year-old, white male was admitted to the Presbyterian Hospital for acute coronary occlusion.

The patient, a motorman, came from a long line of railroad men. His great grandfather, grandfather and father were all motormen or engineers. The patient showed the greatest emotion when he spoke of his father whom he described as a hard working, responsible, efficient person, who was highly respected in the community. In his personal relations he was stubborn, self-righteous, domineering and insisted upon having his own way.

The patient until recent years was healthy, athletic and outgoing. He was stubborn as a child and large for his age. Up until the age of 8 the patient had fears of the dark. He recalled believing with terror fantastic stories circulated in the neighborhood about people being killed and cut to pieces. He was a nail biter. Later in life he became a very heavy smoker and drank 10 to 12 cups of tea and coffee a day.

* Presented at the Conference of the Committee on Cardiovascular Disorders of the American Society for Research in Psychosomatic Problems, New York, November 30, 1944.

At the age of 10 the patient began to assert himself. He ran away from home for a day and a half. The beating he got from his father on his return home is the only one he remembered. But he never tried to run away again.

At school he began to challenge the authority of his teachers. His ambition was to quit school in order to work on the railroad. His father insisted that he return to school and advised him against ever becoming a railroad man. The patient continued to truant. At 13 he arranged to transfer from one school to another. He kept the transfer and never reported to the new school. The father then agreed to let the patient leave school and go to work.

After a few odd jobs and service in both the Army and Navy in the last war, the patient began to work for the railroad and worked his way up to engineer. He then transferred to the City transit system. He had been working at this job for over 12 years when he became ill.

The patient worked very hard and was extremely proud of his excellent work record. The responsibility for the lives of his passengers weighed heavily upon him. As is inevitable in such a career, there were a few mishaps, but these occurred under circumstances in which the patient was not at all at fault, and was not aware at the time of their occurrence. There were several near accidents. After these the patient was extremely anxious about his performance. When standing on a subway platform and hearing a train come in on an upper level, the patient said he would have a feeling equivalent to fear.

Five years before the onset of his illness, the patient's father died of a heart attack which was first diagnosed as indigestion. At this time he began to develop peripheral vascular disease. He also began to notice failing sexual potency and was concerned over possible loss of prestige in his wife's eyes. Shortly afterwards a man committed suicide by plunging in front of the patient's train. His anxiety about his performance increased and he began to drive with one hand constantly clutching the emergency brake. Because of his peripheral vascular disease he was advised to get less strenuous work as a clerk. He tried it for a few months but was unhappy. At his own insistence he returned to the motorman's cab.

One year before his illness, he had a dream in which his train struck down a friend of his, a railroad worker. The patient awoke from this dream in a panic with very severe palpitations of the heart.

Two weeks before his illness a colleague ran down a sailor. The colleague was depressed and was taken off the job to recuperate. Three days later he died suddenly of what the patient said was a heart attack. The patient brooded a great deal over his friend's death. On the day of the onset of the patient's attack, he inadvertently drove his train past a switch at the height of the subway rush hour. This mishap was clearly the patient's fault. When he realized what he had done, he stopped his train and rushed from his cab to the nearest communication point—only 30 feet away. He telephoned the control station in time. On the way back, when the danger was definitely past, he began to experience pain and breathlessness. When the pain grew more severe he described it "as though a truck drove up on me and stayed there."

Of all the aspects of the father image, the patient singled out one especially for his major identification, namely, his vocation. Although the patient was failing in many spheres, he struggled most desperately to maintain his identity in the vocational field. His coronary attack occurred when he was confronted with incontrovertible proof that in this field, most important of all to him, he was also a failure.

CASE NO. 2

M. C. (No. 725506), a 43-year-old, white male, Mexican born, employed as a manager of a large confectionery store, was admitted to the Presbyterian Hospital with the diagnosis of acute coronary occlusion.

He was the older of two children. His father had been for many years a judge in the Criminal Courts of Mexico. The patient referred to him as "a grand old man; the best there ever was."

As a child the patient was a nail-biter but he denied any other neurotic traits, spurning them as weaknesses developed by irresponsible and pampered American children.

Early in life he decided that he could not aspire to his father's intellectual attainments. Against his father's wishes, he started to study medicine and then switched to agriculture. At this point he sent a letter to his father notifying him that he no longer intended to be a burden to him. Again he flouted his father's wishes and left Mexico to study in an American business college. The parting from the family was on bad terms. The patient had never seen his father since.

After finishing school in the United States he finally got a job as clerk in a large, confectionery store-restaurant. He worked his way up consistently until he was made manager of the store with many people under his supervision. The store was one of a large chain. Although he ran the store "like one happy family" he insisted upon being recognized as the unchallenged authority. He delighted in putting his district manager in his place. When the district manager called attention to infractions of the chain store's procedures, the patient vehemently pointed to his

record of mounting sales and profits, and said "everything else is my business." When the district manager said that the patient felt himself to be better than the president of the concern, he said, "Of course I am better than the president. He has only one child; I have four."

Family relations were of greatest importance to the patient. He married a Cuban girl of an aristocratic, educated family. His in-laws offered to use their political influence to secure for him a position in the Cuban consulate. He spurned their offer, telling them to arrange it for some deserving Cuban citizen. He insisted that his wife accept him as the undisputed master of the household. He criticized her over-eating and her attitude toward housework. Some time after his wife gave birth to their second child, there was a serious quarrel which culminated in her taking the two children to her parents in Cuba. The patient made no effort to restrain her. He was certain that she would return and beg his forgiveness. After six months, feeling quite superior, he accepted her apologies and permitted her to return. His picture of himself was that of a devoted father who subordinated all other interests to his family.

Two years before the onset of his illness, his wife fell sick with what later was diagnosed as cancer of the rectum. He resigned his job as manager of the store and obtained a luncheon concession in a drugstore near his home in order to feed and supervise his children during the working day. Six months later, his wife died. His in-laws offered to care for the children, or to render financial assistance. The patient refused. He planned instead to have his oldest child, a daughter of 17, take over the care of the younger children. The daughter, however, was extremely remiss in her responsibilities. She permitted the children to go about unwashed, poorly clad, and to stay out late. She cleaned very little, but spent most of her time reading, or as the patient states "daydreaming." For several months the quarrels between the patient and his daughter had been growing increasingly intense. On the day of the attack, the patient and his daughter were having a particularly severe quarrel during which he struck her. He was amazed and enraged to have his daughter retaliate by striking and scratching him. The next moment he experienced severe pain radiating down both arms, especially the left. He stopped the quarrel immediately, and dispiritedly tried to work at his luncheon concession instead of seeking medical aid. Like the previous patient he suffered quietly for several days before he consulted a physician.

This patient, over-awed by the image of his father, could not aspire to a complete identification with the total person. He could visualize himself, however, as an authoritarian figure and head of family. In this identification he did fairly well until his rôle was challenged in reality by a combination of unsurmountable obstacles. This failure represented to the patient a mutilation of his life rôle which he felt was irreparable.

CASE NO. 3

J. B. (No. 731433), a 43-year-old, white male, married, was admitted to the Presbyterian Hospital for acute coronary occlusion.

The patient was the youngest of 3 surviving siblings. His mother died in childbirth when the patient was 2 years old. He was raised by a housekeeper until he was 14, and then by an older sister. This sister, to whom he was much attached, died when the patient was 18.

From the age of 12 the patient had had a fear of high places.

His early interests were scholastic. He did well in his studies, and won a scholarship to one of the best high schools in Boston. His ambition was to become a doctor. At the end of his third year, his father insisted that he quit school to earn his own living. There was a bitter quarrel, but the patient could not prevail against his father.

He left school and got a job as an assistant in the Pathological Department of a Boston hospital. He liked this work very much because it brought him close to the field he had intended entering professionally. He got along well on jobs only on the condition that he play an independent rôle. He accepted responsibility and liked to be his own boss. When he had to submit to authority, he did so but said "I would boil away underneath."

He kept this job for 5 years. During this time he developed an allergy to laboratory animals. This disappeared with treatment and did not recur, even though the patient later kept household pets without receiving further treatment.

His next position was with one of the largest hospitals in New York. He began as a clerk at the information desk, and after 13 years had advanced in position and esteem, so that he was frequently called upon to act as night superintendent. When the vacancy for the position was to be filled, however, the patient was rejected because of his youthful age. He was incensed, especially since he had trained many people and had many employees under him.

Accordingly, he resigned and obtained a position as executive with a trucking concern. He was relatively satisfied with this job which terminated after 5 years, when the company closed down.

In the period that followed the patient was at a loss. He could not find the kind of job that suited him.

He tried working as an elevator operator but could not become reconciled to his changed situation. For a while he did not work at all.

One year before, desperate for employment, he accepted a job as a spray-painter in a ship yard. Although he was well liked by his colleagues who promptly made him secretary of the union, he felt himself unsuited for outdoor physical labor. He complained constantly about the working conditions and refused to wear a protective mask, although this was strictly required. With the advent of cold weather, he contracted several colds. When he asked his employers for his discharge, they said they were unable to grant it unless the patient first got a release from the War Manpower Commission. The patient pleaded his case before the Commission. His application was rejected because of insufficient evidence of physical disability. The patient was referred to his family physician for certification of illness. Although the patient was not pleased with the outcome of this interview, he felt he would be able to obtain such a certificate. On his way home from the War Manpower Commission, while travelling on the subway, the patient was seized with severe precordial pain and shortness of breath. He managed with difficulty to reach his home. One hour later he entered the hospital.

As a former acting night superintendent he felt himself above hospital routine. He brought down upon himself several lectures from the attending physicians because he refused to rest and continued to smoke. He continued to disregard their advice, however. He behaved like the most important person of the ward.

This patient's attack occurred after his image of himself as an executive and superior individual was destroyed. His behavior in the hospital indicated an attempt to deny that he had lost any ground. Instead, he entered once again into a competitive relationship with the attending physicians, a development to which he was predisposed for obvious reasons.

CASE NO. 4

A. D. (No. 644966), a 48-year-old, white male, married, artist by occupation, European born, was admitted to the hospital for his third attack of coronary occlusion in four years. His illness began five years earlier at a time when he was residing in Europe. Originally he had symptoms which simulated coronary heart disease but an electrocardiogram taken at the time was normal. During the present and previous hospitalizations, for the first time in his life, the patient experienced anxiety attacks when his wife visited him.

The patient was born in a small town in middle Europe, the youngest of three children. His father was a small, but successful, business man who represented to the patient "the epitome of the petit bourgeois." He was dour, and according to the patient, unimaginative and authoritarian with his children, and quarrelsome with his wife. In these quarrels the patient sided with his mother. The father was extremely ambitious for his family and insisted that his children complete their university education even if they had no desire to do so.

The mother, the patient felt, was soft, tender-hearted and loving—altogether an extraordinary person to whom the patient was devoted throughout her life. He spoke of his sister in similar terms. The patient did not marry until after the death of his mother. He was so shaken by the untimely death of his older sister and the death of his mother shortly thereafter, that he was unable to work for six months.

When the patient completed his high school education, he had a bitter quarrel with his father who insisted that he get a University education. The patient wished to study art for which he showed talent. The father, however, was adamant and the patient finally compromised by promising to get a degree in architecture, which he did. He handed his diploma to his father saying, "You wanted me to get this degree. Now I have it, but I shall never use it." Thereupon he left home and studied art on his own—without attaching himself to any particular academy.

His career was interrupted by the war. While recuperating from a wound sustained in battle, he began to paint again and was extremely successful. After the war and his army discharge he returned to the capital of his native country where he held a one-man-show. His moment of greatest triumph was to see how his father was impressed with his success.

Following this he left his home again, and went to France where he became a successful illustrator and copier but no longer practiced what he called "fine art." He worked prodigiously accepting orders which he was unable to fill except by toiling far into the night. His most successful creations were bitter characterizations of the leading statesmen and political figures of the continent.

The patient delayed marriage for many years. Finally, after the death of his mother, he married a divorcée who had a child by a previous marriage. This step was taken only after years of indecision. There was some sexual difficulty in the marriage which the patient was reluctant to discuss. Concerning his problem the Rorschach report states the following: "Extreme repression of instinctive drives indicates inability to integrate the instinctive area of experience with the rest of life. He is sexually inhibited and is even aware of a marked sexual problem. Some anxiety

is present but the subject refuses to face it, to admit that he worries or is critical of himself."

The patient's first anginal symptoms appeared shortly after his marriage.

Throughout his life the patient had had recurrent dreams concerning his mother which caused him great anxiety. In more recent years the character of these dreams had changed. The current theme was mistaking his mother for his wife and vice versa.

Despite the fact that he had several attacks of anxiety in the hospital, the patient maintained an outward appearance of cheerfulness, tending to minimize his symptoms. Even in the hospital he worked at top speed, doing illustrations and copies in addition to making caricatures of the interne and visiting staff, which he passed around to the great amusement of the other patients.

In his life history this patient demonstrates most explicitly the deepest constellation of childhood attitudes from which he was unable to free himself through the normal medium of total identification with the father. Evidences of his unending devotion to his mother and his fear and hostility towards his father, together with the unconscious childhood wish to destroy and replace the father, were manifest throughout this patient's life. It was only with the greatest reluctance that he could, later in life, regard himself in the role of a married man with a wife of his own, and in this respect he was only partially successful. When he attempted to realize this most cherished wish of his, he was frustrated by his unconscious fear and guilt. What he had attempted to exclude from awareness by characterological defenses and by alteration of his life-plan, could no longer be evaded. He did not measure up to the image of himself, the image he created in his childhood fantasy and with which he hoped to compete and surpass the all-powerful father.

(While it is beyond the scope of this paper to enter into all the unconscious dynamics of the cases outlined, it would not be amiss to state at this point that the constellation of attitudes described in the discussion of this patient is implicit for all the other cases. They differ in the manner in which various psychological defense mechanisms are successful in obscuring the essential conflict.)

CASE NO. 5

T. D. (No. 502744), a 35-year-old, white, married male, employed as a special policeman was admitted to the hospital for his first attack of coronary occlusion.

He was the oldest of nine children and felt his position very keenly; even at this time he maintained supervisory attitude over his siblings who came to him for advice. The patient stated his major interest was "my family and their education."

His father was a devout Catholic. The patient described him as an "honest, hard working man who was our pal. He taught us to play ball hard and be good fellows, but was always strict about our hours and manners." Above all he recalled his father as a good provider who never deserted his family.

The patient felt his mother looked upon him with special favor and he, in turn, regarded her as a person to whom "you could come to, right or wrong, and confide in."

As a child, the patient had recurrent nightmares and several episodes of talking in his sleep. He was a good athlete and a serious student who at one time contemplated entering the priesthood. Throughout his life he had regarded himself as an individual who "abides by rules, deliberates, but who argues and fights when he feels he is in the right."

After the patient completed high school he worked as a clerk for several years, continuing to study at night. He completed two years of business school in this way. When he married and began raising a family, he felt he was not doing well enough by them. Accordingly he studied engineering at night and, in addition, took on a part-time job in order to supplement his income. For months before the onset of his illness he was getting as little as 4½ to 6 hours of sleep at night.

During this time he caught cold. This was the first illness in his life that he could remember and this made him extremely depressed. In this connection he stated, "I was never sick. I always guarded my health by going to the gym and doing athletics. I always considered health a major factor and wanted to stay young. Now I feel that I have to be as good as new for my family. If I am going to be an invalid I may as well be dead." Seven days after the patient recovered from this cold, he sustained coronary occlusion. In spite of his statement above, the patient had scarlet fever and rheumatic fever as a child. This denial of weakness or illness was characteristic of his attitude toward heart disease. He refused to come to the hospital even when he was suffering acutely from air hunger.

When his over-work was discussed in connection with the onset of his heart disease, the patient said, "working long hours wasn't hard on me. You get used to it. You can do anything if you make up your mind to do it."

The utilization of a pattern of compulsive overwork to avoid facing the possibility of inadequacy in regard to family responsibility is very apparent. The physical breakdown which preceded the onset of the coronary

disease signalized the failure of this defensive attitude. The illness marked the culmination of a protracted but unsuccessful struggle to maintain his role as head of his own and his father's family. Shortly before the onset of his illness, the patient realized that his efforts would end in failure. The case illustrates the brittleness of the characterological defenses which is typical for patients with this illness.

CASE NO. 6

C. C. (No. 568742), a 50-year-old, white, married male station attendant, entered the hospital for treatment of acute coronary occlusion. He had had a pre-existing hypertension for several years.

The patient was born on a farm, the sixth of eight children. He remembered his father as a powerful, robust and hard-working farmer who was never sick in his life and who lived to be 83. He was a strict church goer, and had no vices. The children "knew that he meant what he said. He would not have to tell us a second time to do something. When I followed his suggestions I never got into trouble."

In contrast, the mother was even-tempered and jolly, "a typical farm girl." Although she was not strict, she supported the father in his discipline.

As a child, the patient was aggressive and active, insisting upon having his own way. He got into fights frequently but had to curb this behavior because of his father.

All the patient's siblings did well in their marital and professional lives. In this respect the patient was a notable exception. Before he completed high school, the patient decided to strike out for himself. After working at several odd jobs he decided to get a business training and learned accounting. But the inactive life was not to the patient's liking, and he resented prolonged authority. Although he had been as long as thirteen years on one job, he left several times as a result of quarrels, only to return a short time afterwards. The patient said, "On the job I am impulsive and want action. I can't linger too long over the work. I would rather get the job over with than kill time on it. The foreman always finds things for me to do and the first thing I know I have the job finished."

For many years, he hesitated before getting married because he did not feel himself adequate for the responsibility. At the age of 39 he married a divorcée. The marriage was not a happy one. The wife regarded the patient with contempt. She felt he was unable to maintain the standard of living to which she had been accustomed. The patient agreed with her secretly and felt very inferior. After years of marital friction of increasing severity, the wife took their child and left the patient to return to her home in Texas. A few weeks later the patient sustained his attack of coronary occlusion. This aspect of the patient's life was most difficult for him to discuss. He did say, "Right now I don't have much of an opinion of myself. It's more of a helpless feeling."

In the hospital the patient was very active and restless, insisting that nothing bothered him. He denied any emotional involvement in his marital problems and minimized his symptoms saying, "I'm not the type to worry about my health—worrying doesn't help it. Heart trouble is not so serious as long as I can eat, and I'm not one to be running to the doctor when I have a pain."

The association of hypertension with coronary artery disease is worthy of note in this case. Earlier investigation into the personality of patients with hypertension has demonstrated that ambivalence concerning the problem of dependence is of primary significance. This trend is noticeable in the patient's relations with his employers and his wife. There is, in addition, a constant drive towards autonomy which never succeeds beyond the stage of interfering with the success of the patient's business efforts. Of all the patients, he was socially the least productive.

The early rebellion in this case took the form of refusing to conform to the standards of achievement as laid down by the father. The marriage late in life to a divorcee with a child has the same dynamic significance as in case no. 4.

CASE NO. 7

M. S. (No. 687170), a 38-year-old, white, married, male postal clerk and pharmacist came into the hospital for acute coronary occlusion. Symptoms suggestive of myocardial infarction had occurred four years earlier.

The patient's father was still living and in good health. He always held himself aloof from the family, concerned with his own activities and pleasures to the extent that the mother felt stranded. There were frequent quarrels over this, which the patient resented bitterly, feeling that his mother was entirely in the right. He felt that his father, imposing on the mother, made her nervous and that this in turn led to her early death. He said, "Father is home now and it is through her efforts. She is dead and he is alive."

The patient was the most ambitious of the three children. He was an avid reader of success stories. He was raised in a very poor section of the city, and worked hard in school and afterwards. He was the only member of his family to get himself any professional training. However, he was dissatisfied with his work as a pharmacist and got work as a postal

clerk. In this work he felt frustrated by the meager opportunity for advancement, the long hours and the conflicts with his superiors. He wanted to work at a desk job instead.

He married at the age of 24, but was disappointed in his wife as a housekeeper and mother.

About four years before, the patient became increasingly preoccupied with feelings of disappointment over his inablity to advance financially. He felt very inferior to his business and professional friends who earned ten times more than he. He began to avoid their company because he felt a need to keep up with them but was unable to do so.

In order to increase his earnings he studied electrolysis and began to give treatments at home. At the time of his attack four years before, he had been doing several jobs at one time. At that time he was experiencing pain in the chest which followed overactivity, over-excitement, or over-eating.

Although the patient felt the pressure of the work was becoming more than he could stand, he did nothing to change his work habits—"I had not had a vacation and I felt that I needed one. If I had demanded it, I could have gotten one but I felt that a registered pharmacist is a professional man. While I was working at the post office I would be thinking of someone waiting for me for electrolysis. I felt that I could not let them go—doctors can't take vacations, and I felt that I couldn't take any rest." He felt that having so much to do cut him off from any social life.

The patient felt that his life was marked by many mistakes, the most important one being his failure to study medicine. His illness exaggerated his feeling of inadequacy. He was depressed by the fact that his wife would now be shouldering the burden of supporting the family. His attitude in the hospital was characterized by resignation to his illness and a desire to be pampered.

In addition to the personality trends which this patient shares with the others, he demonstrates most clearly the underlying depression which overtakes these patients when confronted with failure. While he protests against accepting a passive, dependent relationship with his wife, his overt behavior is in striking contradiction to this attitude. Much of the compulsive overwork of these patients represents a protest against their strongly repressed passive resignation to inferiority and to the role of the dependent child.

These patients with coronary occlusion represent a specific type of character development. They make a spurious and only partial identification with the father. The image of the father is exaggerated out of all proportion by the childhood anxiety. The identification is made less out of admiration and more out of fear. The identification, however, is not complete and thoroughgoing. Above all, in the deeper layers of the patient's personality, it is unconvincing. The patient feels much like a youngster who is masquerading successfully in his father's clothes, and who is frightened lest at any moment he be caught, exposed and punished. In order to make this masquerade seem more convincing, the patient pursues his usurped role all the more aggressively. To a certain extent the disguise deceives the patient himself, but this is never completely so—his deep-seated lack of conviction accounts for both the compulsive competitiveness and the traumatic effect of the experience of failure. Inwardly convinced that he is a sham, the patient cannot accept success. This inner insecurity and sense of weakness which the patient fears to face, and which he seeks to deny, remain unaffected by realistic achievements. For this reason he needs ever new successes to alleviate his own doubts.

It is not simply the experience of failure which proves so traumatic to the coronary patient. What disturbed these patients most was to fail in the rôle of their major identification, and to fail under circumstances which convinced both the outer world and themselves that they were not as good as they had thought. Such failures have the significance of an unmasking. When the façade of feigned omnipotence is ripped away, the patient is forced to face his inner sense of weakness and fear. These are the very feelings which the patient tried to exclude from consciousness by compulsive aggression. How desperately these patients try to deny these feelings, even in illness, may be judged from the difficulty the physician has in keeping such patients in bed, and from the manner in which they try to carry on their business as usual from the bedside. When this denial fails, the patient frequently becomes depressed, feeling that he is no longer of any account.

I do not wish to convey the impression that the experience of failure in the patient's major identification is the sole and competent cause of coronary occlusion. My intention is to explain why this particular kind of event proves so threatening to individuals with this type of personality and characterological defense. The psychosomatic implications of an acute emotional trauma against a background of chronic tension have been discussed in detail by many authors (2, 11, 7, 9, 6).

It is interesting to observe that Kemple (8), using the Rorschach test in an independent study on a large series of cases at the Presbyterian Hospital, came to very similar conclusions. She states that the following

traits are found to be distinctive for patients with coronary occlusion:

"The subject possesses high average intelligence. He is extremely ambitious and has good organizing ability. He generalizes compulsively. He is active and aggressive but productivity is inhibited by anxiety.

"The inner life is dominated by infantile instinctive drives. Strong hostile aggressive impulses arouse feelings of guilt and inner tension. He lacks subtle adaptive responses and sensitivity to nuances in his environment. Moods and feelings are not stable. He displays oral dependence, guilt, depression and anxiety regarding his adjustment.

"When seen in the hospital after having suffered a coronary occlusion, these patients are usually in a severe anxiety state which is only partly related to recent physical trauma. The anxiety is also related to feelings of inadequacy, failure and guilt. The guilt may be associated both with their status in society and with specific sexual relationships. Frequently, these inadequacy feelings are not acknowledged but are projected onto the outer world producing an attitude of critical cynicism."

What we see in the patient who develops coronary artery disease, is a combination of a certain type of conflict and a special form of attempting to deal with this conflict. A similar conflict with a much feared authoritarian figure is met with in patients who develop phobias. The phobic patient, however, admits that he is afraid and adopts mechanisms of flight and evasion. The coronary patient denies his fear; he masks his anxiety by transforming it into aggression. Where the phobic patient becomes passive and submissive, the coronary patient becomes active and competitive. The coronary patient thus evades a neurosis by means of a character deformation. He pays the price, however, in a predisposition to this somatic disease. Together with constitutional and other factors this long-standing, unabated tension helps consolidate the predisposition to the development of this illness.

The kind of identification made by the patient who develops coronary disease is encountered in the psychology of certain women. This type of woman has been described frequently in the literature (10, 3, 1) and is not uncommon, especially among career women. It is the woman, who out of sexual fear, identifies herself with the male and tries to carry out the illusion in one form or another that she is male. Under this guise, she enters into competitive relationships with men, attempting to conquer her fear by transforming it into aggression. This sort of drive and motivation frequently lead her to success in professional and business fields. There is, however, the same lack of satisfaction and the need for ever new conquests to convince her that the masquerade is still effective. What she fears most is the situation of exposure—a situation to which she responds with anxiety or with outbursts of aggression. The situation with the patient who develops coronary occlusion, we see, is the same except for the response to exposure, which in this case is either somatic disintegration or depression, and occasionally both. Here again then we see how a partial identification with a feared object, because it is unconvincing, results in compulsive striving in which achievement does not resolve anxiety or alleviate tension.

Employing the mechanism of identification involves these patients in a further complication. It sensitizes them to the vicissitudes of their parents, colleagues, or other individuals who are of significance to them emotionally. As a consequence, the burden of tension which they must bear is made heavier.

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DISCUSSION

Edward Weiss, M. D., *Chairman*

Dr. Weiss: I would like to preface the discussion by saying that there has been a good deal of writing on the question of whether the emotions have anything at all to do with coronary artery occlusion. There are many who deny that they play any part at all or assign to them a very inconsequential role. We would like to discuss whether there is some specific relationship, such as that just outlined by Dr. Arlow, between the emotional life and the precipitation of coronary occlusion.

From time immemorial we have said to people who are about to get angry, "Now, look out for your blood pressure," as a common acknowledgment that anger is related to elevation of blood pressure. An old lady consulted me the other day. She was about eighty. As she came into the office and looked me over, she said, "I don't know whether I am going to like you as a doctor or not."

I said, "What was the matter with your last doctor?"

She said, "I didn't like him much, either."

I said, "Why?"

She said, "Well, as he was taking my blood pressure, I said to him, 'What did they call this stuff before they knew about blood pressure?' and he had the nerve to lean over and whisper to me, 'Bad temper, Madam, bad temper'."

Now, if there is any relation between repressed rage and hypertension, or to make it a little more definitive, hypertensive-vascular disease, how does it work? I would like very much to hear from some of those who spoke this morning. I am sure they are interested in this topic and can raise some critical questions.

Dr. George Daniels: In Dr. Weiss's discussion, he ended by bringing up the question of what the constitutional and hereditary factor might be in these problems of hypertension and coronary occlusion. I would like to follow on a little bit the discussion that Dr. Arlow gave in his paper and point out some of the work that Dr. Dunbar and some of her co-workers have done at Presbyterian in relation to this problem of so-called pseudo-heredity. There is no question that in organic heart disease and in hypertension, we get this very striking familial incidence. I think we are all pretty well agreed that there is something of very definite biological importance which we always have to keep in mind.

On the other hand, this is admittedly something that we can't do anything about, although we should as far as possible evaluate it.

Dr. Arlow in his discussion of identification with the parent or partial identification brings up this very important question, namely, to what degree the fear of identifying with the parent about which there is a conflict has to do with the later organic condition. We heard this morning emphasized the fact that emotion constantly leads to an increased cardiac output and, therefore, a greater strain on the heart. I have been very interested in following a case which later turned out to have coronary occlusion, which for many years before had a neurosis. In this instance one would have to take issue with Dr. Arlow's question of whether such cases as develop coronary occlusion don't avoid a neurosis. I think there must be some different constellation in these cases, but I think one of the reasons that we haven't known more about them is until recently many of those cases have gone on from the psychiatrist to the internist and they haven't been able to get their data together.

Freud, 'way back in his discussion of anxiety neurosis brought out the fact that in some of these cases, they go on to organic heart disease. To come back to the problem of identification and pseudo-heredity, certainly in my experience the points that Dr. Arlow has brought out are frequently true, with the hostility developed toward the father. This hostility has to be evaluated in relation to the later development of the condition, plus the fact that if the father has died of heart disease, that adds the problem of constant fear of meeting the same fate. One therefore has an added anxiety factor.

Let me illustrate in a case that came to my attention a few years ago of a man of thirty, who had a very severe cardiac neurosis with fear of sudden death. His father had died when he was eleven years of age of heart disease. The patient at fourteen developed a very peculiar habit. Before he went to bed at night, he had to place his shoes sole up, kick them four times, and then place one shoe down with the other sole up, and then jump into bed. This seemed like a very senseless procedure, until in the analysis it became clear that this was reënacting the impulse that he had had when his mother called to him at the time of his father's death to go out and get a doctor. He saw the father lying there prostrate and had the impulse to go up and kick his upturned feet which were turned toward him as he went out.

In such an instance, one can understand why later in his neurosis he feared that he might have the same fate as his father; and, therefore, any situation in life, whether through marriage or through work, which tended to put him in his father's shoes, would bring about a considerable reaction.

I wanted to bring up one other point, and that is in connection with the anxiety following the occlusion. Dr. Arlow brought this out only in connection with the psychologist's report on cases. I think it is worth mentioning, however, that in many cases an anxiety which has been present up to the time of the occlusion suddenly disappears for a period and then may reappear, and in one patient that I have followed there is a definite crescendo of anxiety followed by an attack with occlusion, the lessening of all the anxiety and a later building up again.

Dr. Carl Binger: Whenever I hear a characterological description such as Dr. Arlow gave so excellently, I have the uncomfortable experience of not giving it as much credence as I do my own observations. But when one actually observes these patients oneself and encounters, time after time, the same kind of life-situations, one gets an inner conviction of a certain truth about them that is very hard to impart to others; and others are inclined to listen to such descriptions with skepticism.

Such an attitude of skepticism is natural and helpful. No one need longer be skeptical, however, about the fact that emotional disturbances can play an important part in precipitating an attack of coronary occlusion. Almost any experienced clinician can cull from his memory examples of such occurrences. Dr. Arlow has provided us with several. The more difficult problem is the general one implied in Dr. Arlow's contribution. It can be stated thus: Is there a specific etiological relationship between the personality which he and Dunbar describe and the disease known as coronary arterio-sclerosis or atherosclerosis? I do not believe that our state of knowledge is as yet such as to permit us to answer this question.

Dr. Bettina Warburg: I am interested in Dr. Daniel's addendum: While I fully agree with the picture that Dr. Arlow has given us, I also think we are looking only at the surface situation and that the underlying emotional structure is a much more complicated one.

No doubt Dr. Arlow could have elucidated further had he had more time. I believe it is somewhat misleading to assume that it was only the motorman's failure to live out the identification with the father successfully which played such an important role. Since he so much wanted to equal or to surpass his father's performance, it becomes highly significant to understand why he was unable to do so.

Although this patient, like many other sufferers from coronary disease, expressed only the greatest respect and reverence for his dominating and severe father, it seems more than likely that he must often have felt very angry at the father but was unable to express it openly. We do have ample evidence of the deeply repressed rage of which he was quite unaware because it was never permitted to enter consciousness, but which is clearly shown by the patient's actions and symptoms.

It is interesting that this patient, like many other men who later developed coronary disease, ran away from home as a boy and truanted, probably to get away from the father. His ambition was outspokenly to be a railroad man but in order to accomplish this end he had unconsciously to dispose of the father, who would not allow him to be an engineer but wanted to keep him subject to authority. Therefore, in fantasy, he had to eliminate the father in order to take his place. This is no simple identification: It involves a wish to murder and supercede. Hence a sense of guilt for the unconscious crime which first broke through in the anxiety about being responsible for accidents while he was running his train.

The actual death of the father occurred when the patient was 36 and was promptly followed by disturbances in the vascular system and in potency, as though to punish himself for what he unconsciously wished to do to the father. After his train had killed a man, he became so upset that he temporarily changed his work but he had to return to his cab to fulfil his unconscious wish, as evidenced by the dream in which his train struck down his "friend," a railroad worker. He awoke with palpitations and panic. (It will be remembered that the father died of a heart attack.) Subsequently the patient undoubtedly identified himself with the other engineer who ran over a man, then suffered remorse and died of heart disease. Only two weeks later he ran his own train past a switch, and although he prevented the "accident" which his unconscious impulses impelled him to provoke, he promptly had a heart attack himself.

How such somatic compliance can take place remains a problem for the neurophysiologists and the medical men. To the psychiatrist it looks like an organic form of suicide, which, in most instances, is known to be determined by the unconscious wish to commit murder.

I believe that the attempt to eliminate angry feelings and to repress them is of the utmost importance in coronary disease. These patients at first tend to say that they have only love for their families and never get angry with anybody. They pride themselves on avoiding fights, particularly with their wives. During subsequent interviews with the attending psychiatrist they become more confidential and often admit that they are subject to violent anger which occurs suddenly in connection with minor episodes in their everyday lives, but they try to "keep it all inside of themselves" and struggle against venting it on others. Two or three men thought that they had developed "heart trouble" because they never could let out their anger at some specific person. For instance, when illness in the wife made it necessary for the patients to perform all sorts of household duties which they considered beneath their dignity, and to wait on the wife, they at first tried to convince themselves that they did not mind this situation at all. When they finally recognized that it made them angry—"I get very angry with my wife but I know I should not be angry with her because she is sick and might get sicker or even die. I told the doctor that that is what gave me my heart trouble."

This leads me to a second characteristic in the personality of coronary patients, which is not brought out in Dr. Arlow's cases: These men have a specific problem with their wives which derives from a deep-seated attachment to the mother. Nurses in the hospital comment that these cases are easily upset by minor frustrations and delays in the hospital routine and demand a great deal of attention. Their exaggerated pseudo-independence previously had concealed not only the continual struggle against father figures, but also their strong, unsatisfied dependent wishes. Their illness supplies them with a justifiable reason for insisting upon that type of motherly care for which they long but to which they could lay no open claim because they would have considered it a sign of weakness. Dissatisfaction with hospital situations gives them an opportunity to discuss past dissatisfactions with their wives, which they usually claim never to have verbalized before. It becomes clear that what they unconsciously want is to behave like only children who cannot be satisfied, no matter how much the mother does for them.

I would like to add one other point: The attacks of anginal pain following coronary occlusion are frequently found to be connected with thoughts and feelings stemming from emotional foci of repressed anger. Consequently when such attacks of pain or discomfort occur during a psychotherapeutic interview, they provide the physician with a clue to the type of hostility which is being repressed and converted into somatic self-punishment at that moment.

Dr. Leon Saul: It seems to me we have gone from one extreme to the other in the two sessions this morning and this afternoon, from the deeper details of the physiology of the kidney on up to the refined psychological mechanisms of identification. The questions I would like to raise have to do with the intermediate steps between the two. I think that always, in establishing psychological correlations, we feel more satisfied if we can reduce them to what might be called biological terms; that is, understand why the organism under certain stresses reacts in certain ways physiologically. Now, I certainly can't do that with this condition, but I would like to raise a few questions about it.

Dr. Arlow has described this correlation between the character and the occurrence of coronary and Dr. Binger has raised the question of what the two have to do with each other. Now, if we try to extract out of the character the most striking features, I think at least a few points stand out. One of these was stressed by Dr. Arlow, and that is the anxiety. He traces this anxiety pretty much to the man's own hostilities as in the cases of essential hypertension, and Dr. Warburg has also now stressed the role that hostility

may play. It is very easy to see why the heart should react strongly in fear or anger.

The first question, therefore, is, is the source of this fear or anger, presuming that they are what affect the heart most directly, of any importance? In other words, does the source matter if the important thing is that the strain on the heart arises from the man becoming angry or repressing his anger, or from becoming very much afraid or repressing his fear? Then, is it of any importance whether this anger or fear arise from an identification or a partial identification with the father, or does it matter at all whether it is the father that he is angry at? What is the connection, in other words, between the more subtle parts of the personality organization and these more primitive emotions which we can much more easily, perhaps only because of limitation in our own thinking, tie up with the actual heart beat or actual strain on the heart?

This raises another question. Is the competition important in it? That has been stressed by other authors also. McLean and Miller and, I believe, a number of others have described the competitiveness of the coronary patient. Is that important; and, if so, is the importance due to its acting as a source of hostility and fear, or does it also operate directly? That is, if these individuals are really of an infantile type, as Dr. Warburg described, but are driven by their competitiveness to try to maintain for themselves more superior positions in life than their emotional and characterological organization really can stand, do they not subject themselves to a continual excessive drive and, therefore, the ambition and the competition act as a burden on the heart because they act as continual stimuli to excessive exertion?

There is, of course, the rather popular theory as to precipitants of coronary disease. John Hunter said, "My life is at the mercy of any scoundrel who can make me angry." Practically stated, he at least considered that played a direct role. Now fears are also considered, and also overexertion. So I would like to ask Dr. Arlow whether he thinks that any of these more primitive emotions form intermediate links between the character structure and the symptom.

Just one other point. This status of the hostility and anxiety is quite close to that which has been described in essential hypertension. Therefore, these would form two very interesting control series if it would be possible to distinguish the differences between the two. One might get a little more hint as to the specific factors that we are all interested in and the ways in which they affect the cardiovascular system. I would like to ask Dr. Arlow whether he has gone into that matter or can say a few words about it.

Dr. Henry Richardson: The discussion made me think of the Brunswick paper about identification with the enemy. Dr. Daniels' discussion suggested a guilt factor in that with the onset of pain, the anxiety disappeared. If anxiety is fear plus guilt, it suggests the possibility that the pain reduced the feeling of guilt and thereby relieved the anxiety.

I have been interested with the others as to why these people don't get an ulcer, or fat, instead of heart disease. At what level is the psychosomatic unity formed or, to put it chronologically, at what date in the history of the personality; is it supposed to start from infancy or at some later period in the life development? Just where does that correlation occur?

Dr. Ernst Boas: I think that even a hard-boiled clinician like myself will agree that emotional trauma often induces cardiac infarction. But the problem raised this afternoon is rather whether it is the general physiological effect of the emotions, the actual strain on the heart, on the circulation, that causes the cardiac infarction, or whether there is a very specific mechanism at play. In the case, for instance, of that railroad man, did his consciousness of failure in his career induce the cardiac infarction, or was it the fact that he was afraid that an accident might happen to his train, that he rushed to the signal station and rushed back again? Did those factors of fear plus physical exertion induce the cardiac infarction?

I could cite dozens of cases in which an emotional element precipitated a cardiac infarction. I recall a man who heard a crash of automobiles in front of his house, and he dashed to the window and saw that his son's car was in the wreck, and he immediately had symptoms of angina pectoris followed by cardiac infarction.

I recall the case of an elderly physician who had hypertension for some twenty years but was so afraid that something serious might be told him that he never went to a doctor. Having a little indigestion, he decided he had a cancer of the stomach, but he was afraid to seek medical advice, and finally he said to himself, "If I have lost weight, then I surely have a cancer." Then he didn't have courage enough to weigh himself and every morning, when he entered his office, he debated with himself whether he should get on the scale or not. Finally, after a month he got up enough courage to get on the scale and on the spot he had a cardiac infarction from which he died.

I think, too, that we should be much more precise in talking about coronary patients. What is a coronary patient? First of all, we have to recognize that the coronary occlusion or the cardiac infarction is just an accident in the course of arteriosclerosis. Now, do you gentlemen mean that these mental mechanisms are the causes of arteriosclerosis or are they just effects superimposed upon arteriosclerosis that produce a certain cardiac accident? I think we have to be very precise in our thinking there. We know that cardiac infarctions can be caused by all kinds of specific things. They can be caused by effort, by cold, by infections. We often see it following a mild grippe or pneumonia. They can be caused by sensitivity to certain proteins, allergic reactions. I have seen it after serum sickness. I have seen it in patients who have taken certain drugs. So the actual coronary occlusion or cardiac infarction is an accident in the course of a chronic disease which is arteriosclerosis.

Now, a great variety of indifferent stimuli may precipitate cardiac infarction in a patient with coronary arteriosclerosis. Emotion is one of these things. Is it then the general physiological response of the body to emotion that causes this event, or is there actually a specific mechanism at play, bound up with personality of the patient? That seems to me to be the crux of the problem, and so far as I have been able to gather, that particular point hasn't been proven as yet.

Dr. Louis Katz: I hesitate to enter the discussion because frankly I am like a person seeing a new type of painting

which he is not fully equipped to appreciate. Nevertheless, I have had certain reactions to the presentation which I wish to outline. First, will Dr. Arlow tell us whether the random samples of people with myocardial infarction—which I assume is what these patients had—are sufficiently great and sufficiently unselected so that he can say that this is the type of personality picture that all or most of such patients would have? Or is the selection too meager, the analysis too incomplete, so that he presented the personality make-up of only one out of many varieties of persons who have myocardial infarctions?

Secondly, I cannot conceive of an arteriosclerotic placque developing during an emotional episode. It is possible that atheromatous material from an existing placque might be released by such an episode and be the starting point of a clot in the coronary artery. It is also possible that these patients may have developed a severe coronary insufficiency during the emotional episode which was sufficiently intense to lead to local myocardial ischemia and infarction. In these two ways, the emotional episode might be a trigger mechanism in patients with coronary sclerosis. I doubt whether this is true in the majority of patients who develop an acute myocardial infarction.

The old dictum still holds that all of us are born with a certain longevity. This longevity is expressed in the maintenance of "rubberiness" of our arteries, and as we "burn the candle at both ends" we hasten the loss of this "rubberiness." In other words, whatever be the genesis of arteriosclerosis, and particularly that variety we call atherosclerosis, increased stress of living hastens its appearance. The competitive, compulsive individual lives faster, and therefore increases the rate at which arteriosclerosis, including coronary sclerosis, develops. Statistically, therefore, such a type of person has an increased hazard of developing the acute episode known as myocardial infarction.

Dr. William Dock: I would like to ask this same question as to the percentage. Twenty-five per cent of us in this room will die of coronary disease, according to the statistics on deaths of physicians during the past few years as they are published in the J. A. M. A. I would like to know what percentage of people of our group would be expected to have personalities such as have just been outlined to us. I thought I recognized myself rather clearly, but I shall not ask for a showing of hands.

I would like to point out that in North China there is no coronary disease. This has been emphasized by Dr. Dienaide, an eminent cardiologist who spent a good many years there, by Dr. Snapper who spent several years there, and to a Missourian like myself it was confirmed by the pathologist of Peking Union Medical School, who told me he had not seen coronary disease in any of the adult patients that he had autopsied. I think we can take it as well established by competent observers that in North China there is almost no coronary occlusion in the native population.

Now, the Chinese are famous for the repression of their emotions. They practically never show rage. They are also famous for the rather intense familial relations, for the parental influence is very strong. The imitation by the child of his father, the recapitulation of the father's career is almost inevitable for a very high percentage of the sons. I gather from reading Miss Buck's book and from the Chinese whom I knew in San Francisco that they have just as much emotion as the rest of us, that they have all of the stresses that we are exposed to. They are not free of ambition. They cut each other's throats and raise Cain in Chungking just the way we raise Cain in Washington. They aren't very different from us, except that they have learned to suppress the exhibition of their emotions probably better than any other people in the world.

So I would suggest that perhaps repressing emotion is not so bad for the arteries as has been suggested in today's discussion. The most repressed nation in the world, as far as exhibition of rage and disapproval is concerned, has the world's lowest incidence of coronary disease.

Dr. Irving Page: I wonder if this isn't perhaps analogous to the circumstance in hypertension, namely that we are considering only a very small portion of those people who have coronary disease. One can think, for instance, of a sort of regular progression from the type of case that Dr. Boas is discussing, in which there is definite arteriosclerosis associated with hypertension. These patients are common in the hypertension clinics all over the country. Coronary disease is one of the things that you expect constantly. One usually finds perfectly definite anatomical evidence for it. But then there are a small group of cases that have been carefully documented which, I think, are very interesting and provide a transition to the psychosomatic. It has been called the "hypertensive diencephalic syndrome." It is a syndrome one sees a good deal in New York, and even out in the Middle West. There are evidences of overactivity, or at least a disordered activity of the diencephalon. These consist of blushing, crying, hyperperistalsis, tachycardia, sweating, etc.

Many of these people die of coronary disease, in fact a large preponderance of them die of it. Still, their prognosis, on the whole, is usually better than the ordinary garden variety of essential hypertension.

There is another type of hypertension which is even more precisely expressive of the relationship between the nervous and vascular systems. This is the so-called "vasospastic disease," a very rare condition. There are three or four cases that have been very carefully studied in which the patient died apparently of coronary occlusion. At least it was a sudden cardiac death, and yet there was no occlusion found. These were individuals who showed at various times in their lives wide swings in blood pressure. Signs of intense vasoconstriction, particularly in the eyegrounds, were noted. We have seen such a case as this. No occlusion, as I say, was found at death. These are extreme examples of where vasoconstriction, and vasoconstriction alone, could actually cause a coronary insufficiency extreme enough to cause death. So far as is known, the vasoconstriction is of neurogenic origin.

I have the impression that these constitute a certain segment of the cases of coronary disease where the nervous system plays an important role. But I would agree with Dr. Boas that the majority of them must primarily have something wrong with the coronary circulation to begin with, and then neurogenic vasoconstriction is added to it and that is sufficient, as Dr. Katz says, to precipitate a trigger mechanism which may kill them. They may die anyway without the trigger mechanism.

Dr. Binger: Dr. Dock tells us that the people of North China do not suffer from coronary artery disease, although they have rage and other human emotions like the rest of us which, however, they suppress. What does he know, if anything, about the existence of anxiety among the people of North China? This seems to me to be the crucial psychological question.

Dr. Dock: I only know what is in Miss Buck's books, which are set farther south in China, but also in that region hypertension is extremely rare. Chinese have very little hypertension as well as no coronary disease; why, I don't know. The Chinese who come to this country as adults have been raised in China, formed their habits there, and seem to me to exhibit all the emotions we do. They are simply more polite in their outward expression. When you talk with them, you find that they worry about the family, are disturbed when they don't get along well with their wives, especially if the wife doesn't sympathize with the ambitions to change from being Chinese to being more Occidental. I gather that after they have reached maturity in China and come to this country, they have the same emotions, anxieties and worries that we have, but they are very much more polite about the expression of them. So the outward manifestations of rage, I think, are almost completely inhibited in these people. It was suggested in the discussion that the repression of an emotion might be worse than its expression. If that is true, I am sure that the Chinese should suffer much more than we because as repressors they certainly are the highest examples, taken as a race.

Dr. Page: I think I might add just one thing in favor of what you say. General Lim, when he was over here, whom you probably all know, told me one of the greatest problems that was now facing them among the young officers in the Chinese Army was the development of hypertension. They should be suffering from anxiety if they aren't.

There is one other thing I would like to add because the question of familial hypertension has arisen. I have heard it said this morning that it is an accepted fact that the familial background in many of these people, if not in all, is positive. Yet there are several papers which seem to be quite carefully documented suggesting there is no difference between the normotensive and the hypertensive. That disturbed me very much, because I have always thought that there was a very definite relationship, and I still think there is. But actually I think it is fair to say on the basis of the published evidence that the whole problem needs to be carefully re-evaluated. I add this at present because I think many of you are in a position to do so. Certainly just the routine questions that one asks in the average hospital—"Does your family have cardiovascular disease?" or "did they die of apoplexy?" and such like—are wholly insufficient to establish an hereditary relationship.

I think the only thing at present one could consider established is that there are certain families in which cardiovascular disease and hypertension have been far more common than among the average population. The next statement that the majority of the patients with hypertension or coronary disease have a family history of cardiovascular disease, I don't think is adequately established, although I would be inclined to think it probably true. It surprised me in going over the literature to find how weak the evidence was. Everybody just keeps saying it and, as you know, saying it three times makes it true. So, if you will all keep this in mind, the situation will be corrected. Maybe we can eventually get some decent statistics on this important problem.

Dr. Harry Ungerleider: The paper referred to by Dr. Page is a contribution by the Medical Department of the Northwestern Mutual Life Insurance Company and is a study of over four thousand insurance examinations. One of the most striking points in their paper was the fact that the incidence of familial cardiovascular disease was only slightly greater among hypertensive persons than it was among persons with normal blood pressure. Their conclusions were that heredity is unlikely to play an important role in the etiology of hypertension.

Insurance statistics, however, must be carefully scrutinized because this information is collected by many Examiners and one does not know how carefully this has been done. If we feel sure of the source of our statistics then we can come to real deductions. However, the findings of Drs. Feldt and Wendstrand do confirm experience in practically all companies, as there is apparently not more than five to ten points of difference in expected mortality between an applicant who has a short family history and one who says he has a long history.

Dr. Katz: May I make just one more statement? Since Dr. Dock raised the point of racial distribution I wish to draw your attention to a statement made by an able cardiologist, Professor I. Chavez of Mexico. In the peons of Indian extraction in and around Mexico City, hypertension and clinically recognized coronary disease are rare, whereas in the same clinic, heart disease appears chiefly in these two forms in blancos, foreigners, politicos and executives. If I may paraphrase what Dr. Chavez said, the difference between the peon and the others is that the peon has a philosophy of life which leaves him undisturbed by the fact that he is not going to get very far in the world in the sense that disturbs so many competing in our Western civilization.

Dr. Arthur Corcoran: There was a comparable study reported by Donnison in his book "Civilization and Disease." In it he reported observations of arterial pressure in roughly 1500 back-country Kenya negroes, subdivided into age groups of decades. The mean blood pressure did not rise with increasing age, as it does in similar means of unselected European or American groups or in American negroes. Indeed, I think he found only 2 patients with hypertension which persisted at succeeding examinations. Hypertension is thus infrequent in a negro group whose culture and civilization is intact and largely untouched.

As regards insurance data, such as those of Feldt and Wendstrand, it seems to me that the nature of the questions asked the applicant tend to load statistics away from a positive family history, so that if not much difference is found between normal people and hypertensives in such studies it is not surprising. In contrast, in general hospital statistics, the patient is usually only too anxious to confess all sorts of physical faults in his ancestry, so that the statistics are loaded in the other direction.

Dr. Henry Richardson: Dr. Corcoran has been talking, it seems to me, about cultural differences in the same race. When you talk about the Chinese, you are talking about a culture or a race. The Chinese had any number of fathers in the shape of ancestors or living relatives to choose from, whereas in this country there is only one. I wondered if that had anything to do with it.

Dr. Weiss: Soon we must get back to the main point of the discussion. Emotional factors in relation to myocardial infarction may mean something in regard to the treatment of the patient with coronary artery disease and the management of his life, if we know some of the details of his character and emotional life. It is a very important question from the standpoint of economics. Look how our hospital beds are burdened with patients who have repeated heart failure. The kind of social history that we usually encounter deals with unimportant facts, such as that they may live on the second floor, rather than the first; that they drink this much coffee and tea, smoke so many cigarettes, etc., but beyond that, we know almost nothing about crucial matters in their life situations. May it not be that emotional factors specifically related to the personality of the cardiac patient initiate some of the physiological changes that Dr. Stead and Dr. Chasis talked about this morning. So that this is a very important topic from many standpoints, the whole question of hypertensive vascular disease and coronary occlusion and the role that the emotions play. Dr. Cobb, may we have some of your critical comment on this subject?

Dr. Stanley Cobb: There might be something in the recent insurance statistics that would show us statistics in relation to women, because it is in the last fifteen years that women have been smoking cigarettes heavily. Are there more women now than there used to be who are having these disorders?

Then about that extremely important subject of arteriosclerosis—there is hardly any good experimental work on sclerosis. But there are some racial experiments. About 1935, in Moscow, a large number of men who were executives had hardening of the arteries with cerebral lesions, men around thirty-five years of age. These were the men who at a very early age and without any experience were thrown by the revolution into executive positions. This was written up by a Russian named Kassanin, I believe, about 1935.

Dr. Weiss: Would any of you care to hazard some suggestion as to how this emotional tension or repressed rage may work? We see lots of instances of myocardial infarction, of pulmonary edema, cerebro-vascular accidents and various other cardiovascular episodes that apparently are precipitated by these factors. Are any of the mechanisms that we have discussed related?

Dr. William Stroud: Unfortunately I did not hear the papers this afternoon and I only heard the end of the discussion this morning. The thing that most interested me this morning, since my conception of hypertension and coronary artery disease is one of inheritance, was the suggestion that hypertension is similar to diabetes. Dr. Joslin believes, as I understand it, that 30% of individuals who have one parent diabetic and 50% of individuals who have both parents diabetic, develop diabetes.

In the last ten days I have seen 20 cases of coronary thrombosis with myocardial infarction and of these every one had either a father or a mother who died of coronary thrombosis and myocardial infarction within the range of 9 to 12 years older than these individuals. I cannot help but believe that there is something in inheritance in these conditions, which, however, does not contribute much to the treatment, except as Sir William Osler said, "If you want to live a long life, choose your parents."

Dr. Louis Soloff: There are two points that come to mind. The first is the fact that one has to evaluate any talk one hears by one's personal experience. The vast majority of my patients who have had coronary thrombosis are individuals who are sons of immigrants and, so far as I can tell, had nothing to emulate. In other words, they were much more successful business men and much more cultured than their parents. The other point is that of heredity and pseudo-heredity. The latter term, I am not familiar with and I don't know just what is meant by it. I think it is important for us to know that heredity is simply a verbal entity and that it does not have any other objectivity. Before we can discuss it, we have to have some concept of what we are talking about.

It appears to me that heredity or what we ordinarily mean by heredity is simply the concept that, given a living cell and given a proper environment, the cell will tend to develop along certain predictable lines. If that definition were correct, it appears to me that the purpose of medicine is definitely to modify heredity. That brings up, of course, a question that Dr. Dock raised, that the Chinese do not have coronary disease and the Americans do. The question is, how can we modify that?

Dr. Snapper in his book suggested the possibility that the difference may be due to the diet and unsaturated fatty acids. Of course, if that is correct, then the inheritance of coronary thrombosis could be modified by diet or by some other environmental means.

Dr. Arlow: I am gratified by the discussion which the paper stimulated. I think that most of the questions may be answered by restating the limits of the original discussion. It was not my contention that the emotional trauma mentioned in these cases was the cause of myocardial infarction. What I did try to do was to delineate the type of personality and conflict which results in a typical characterological defense. The features of this defense contribute to the development of long-standing and unabated tension. I tried to point out some of the specific features of the conflict and how this tension develops. There is no question of psychic versus somatic but rather a complete psychosomatic unity which is present at all times. Dr. Weiss and others have attempted to direct this question to the physiologists and I tried to support him in this attempt. Many disease entities are characterized by emotional conflict. Why this may contribute to hypertension in some patients, coronary occlusion in others and ulcers in others cannot be answered specifically at the present time. This opens the possibility of a program of joint endeavor between psychiatrists and physiologists to determine what factors in the psychosomatic constitution predispose to the development of symptoms in one organ system rather than on another.

Dr. Binger raised the question of the specificity of the personality profile. While it is seen frequently in patients with coronary occlusion, there are many patients who were studied who developed occlusion and did not conform to the dynamic formulations which were developed here.

Dr. Daniels raised the question of the relationship of the fear of the illness and its later development. In our experience at the hospital we have seen very few patients who had a cardiac neurosis and later went on to develop coronary occlusion. Both from the study of these coronary patients and the hypertensive patients which Dr. Dunbar and her associates have observed, we have seen that those patients who tended to develop organized neuroses or who expressed their anxiety more openly, did not develop coronary occlusion or hypertension as readily or to the degree of severity as did patients without anxiety or neuroses.

I would like to repeat that the psychological factor is only one in a group of many factors involved in illness. There is no doubt that ageing of the arteries takes place. But we also do know that repeated traumata are bound to occur from the exigencies of life and that as the person grows older the personality adaptation becomes more fixed. He is less able to adapt psychologically to new situations.

I agree with the additions Dr. Warburg made to the personality profile. The patients frequently give the superficial appearance of having an excellent relationship with the father. In these instances the conflict is repressed but reappears in other situations with other authoritative figures. The never-ending compulsive competitiveness suggests that more is at stake than can be explained in terms of the objective realities. The factor of unconscious hostility is present, manifesting itself frequently in the turning of the hostile impulses upon the patient. This becomes very plain in the study of the dreams of these patients. The oral mechanisms which Dr. Warburg mentioned have been observed in all our patients, especially the dependence which frequently becomes manifested in the exacting and demanding attitude of the patient in the hospital. The tendency to develop depressions emphasizes the same mechanisms.

Dr. Saul raised the question of the similarity of the personality profile to that of the hypertensive. Our studies indicate that the nature of the conflict and the method of resolution differ in these two entities.

In the situation of fear and envy the coronary patient identifies himself with the feared object and adapts overt patterns of aggressive activity. The hypertensive patient is much more concerned with problems of safety and dependence and is more inhibited in his ability to express himself in patterns of activity. Thus the hypertensives usually achieve less than their talents would indicate while the coronary patients drive themselves to the utmost of their abilities.

The discussion concerning the repression of aggression demonstrates the need for a common language to be used by internists and psychiatrists. The impression gained by several of the discussants that the simple medium of expressing aggression would alleviate tension, is not the impression I intended to convey. In the course of psychological development there are many conflicts which we must repress and maintain in a state of repression. Such repression is successful and it represents a definitive method of dealing with a psychological problem. What happens in many cases, however, is unsuccessful repression. The patient does not escape the original conflict but keeps experiencing it in new forms, with new individuals, instead of with the original father figure. It was for this reason that I compared the coronary patients with the phobics. They too tend to repress conflicts and are unsuccessful. The difference lies in the fact that where the phobics develop anxiety and flight mechanisms, the coronary patient deals with his problems by characterological defenses.

In conclusion I would like to state that one thing has come out clearly in the discussion: namely, the importance of seeing the dynamic relationship between personality and physiological responses, a relationship which opens a very wide field for further investigation by the joint efforts of psychologists and physiologists.

Dr. Weiss: I think that perhaps you will go away from this afternoon's meeting feeling that whether the specific nature of this conflict and personality make-up that Dr. Arlow has described applies to patients with coronary occlusion or not, if you had the opportunity to study your patients with hypertension and coronary artery disease from this psychosomatic viewpoint, you would certainly know them better as human beings and, therefore, understand them better as patients. And too, perhaps you will feel, many of you, that your medical institutions would do well to have somebody skilled in these psychosomatic technics to apply systematic studies to your patients in the medical and surgical departments. I think that then instead of generalizing from a few cases, we can perhaps have a large amount of data that will help us with this very important subject. If you can't do it right now, perhaps in the years soon to come you will be able to, because military medicine has certainly given a great impetus to the development of the psychosomatic point of view. In fact, I think it may be said that just as World War I established psychiatry on a firm basis, so World War II is seeing its final integration into general medicine, and that is psychosomatic medicine. When that integration is complete, we won't need the term "psychosomatic," because good medicine will be psychosomatic medicine.

TOWARDS A CLARIFICATION OF THE CONCEPT OF EMOTION

NINA BULL *

While the customary division of emotion into *feeling,* or affect, and *expression,* or behavior, is a good starting point for any study of emotion, it stands in immediate need of further analysis. In fact this time-honored partition may well be thought of as a point of departure from which the sooner we depart the better, since it is much too crude a classification to be useful any longer.

However if, by way of a beginning, we subdivide "expression of emotion" into two serial parts or phases of a process, we bring to light what would appear to be a fundamental pattern of neuro-muscular performance in general, and one which opens up a whole new line of analytic thinking.

These two serial parts or phases of "expression" are (a) the preliminary motor set, or posture of the body, which being in the nature of a preparation is necessarily first in time (this we shall call the *motor attitude*); and (b) the subsequent activity or movement for which the motor attitude prepares.

It is not always realized that every kind of bodily movement requires some preliminary postural preparation. Some portion of the organism must be stabilized to form a fulcrum from which the movement can take place—as for example, when the shoulder-joint is relatively fixed in order to permit a measured movement of the forearm, or when the chest of an angry person is fixed (unconsciously) to form a base of operation from which the arms can strike effectively. The sprinter bent in correct position—ready and set to go, but waiting for the pistol shot—is a well-defined example of the motor attitude, or postural preparation of the body as a whole, for an action that is to follow.

There is a colloquial phrase used in some parts of the South that gives a graphic picture of the postural preparation. "Fixing to go," they say, and "fixing" in this sense, means just exactly "getting ready." Even in the case of impulsive acts, where no pause can be discerned before the movement, we know from the mechanical requirements of the situation that some "fixing" necessarily comes first in time. Slow motion pictures show this postural preparation and its follow-up in movement as one continuous flow in such a case, with no dividing line between the two.

For present purposes the distinction between these serial phases of expression becomes of primary importance, since it is where a perceptible delay occurs between the two—that is, between the assumption of the preliminary bodily attitude and its logical sequence in overt activity—that "feelings of emotion" (and this includes the "mental attitude") come into the picture. Any particular kind of action prepared for would naturally determine a particular kind of feeling. Thus the attitude preparing for a fit of crying yields one well-known type of feeling—a sorry feeling of wanting to cry. This feeling could even be called a "wish" to cry in the sense that E. B. Holt so well brought out when he defined the "Freudian Wish" in terms of a preparatory motor set. In a similar way the attitude of preparation to hit out at one's enemy yields quite another type of feeling—an angry feeling of wanting, or "wish," to fight; while the attitude of preparation to escape yields just the opposite—a fearful feeling of wanting, or "wish," to turn and run away.

In all such special attitudes the postural preparation, including various behavior patterns of the face and eyes, is accompanied by appropriate organic changes, those in the breathing, circulation and digestive apparatus being particularly noticeable. And the feelings of the organic changes (enteroceptive) would combine with the (proprioceptive) feeling of the body posture itself—and also with the original exciting stimulus—to produce a great variety of complex experiences, some of which we call "emotion."

The concept of bodily attitude being accountable for states of feeling comes very close to the James-Lange theory of the emotions, yet with one most important difference to be observed, which opens up a whole new line of investigation. Both James and Lange realized that bodily changes necessarily preceded feeling, and were the cause of it—and this itself was a tremendous innovation. But since they failed to differentiate between attitude and action, the more generally acceptable "common sense" idea, that *feeling comes before behavior,* could find no place in their scheme. According to James' famous explanation (5), we do not cry because we first feel sorry, as people generally think, but just the reverse. In short, he said the sorry feeling comes "because we cry." *But according to the present thesis, the sorry feeling comes with readiness to cry, and not because of actually crying.* The fact is, that we feel *less* sorry when we start to cry in good earnest; and crying that is violent enough eliminates the sorry feeling altogether. The

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same holds true of anger and fear, and from the present point of view we feel angry as a result of *readiness* to strike, and feel afraid as a result of *readiness* to run away, and not because of actually hitting out or running, as James explained the sequence. In other words, feeling, or affect, arises from preparatory attitude, maintained as readiness or wish (4), and held in leash pending the lifting of whatever form of interfering mechanism is holding up the action. Feeling accordingly would constitute an intermediary or parenthetic phase between the assumption of a preliminary motor attitude and the subsequent activity. This latter must of course be adequate in order to be final and bring the stage of feeling to a close.

The three main stages of the sequence in its simplest form can now be crudely diagrammed as in figure 1, with feeling and motor attitude ending abruptly as

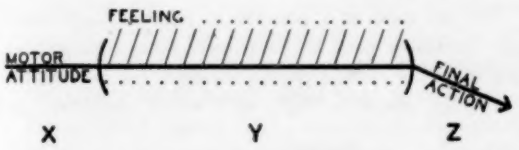

FIG. 1. The continuous black line represents the continuity of the response. Stage X is the preliminary *motor attitude* before it reaches consciousness; stage Y, the *attitude* continued, and giving off afferent nerve impulses (represented by the upward slanting lines) that register in consciousness as *feeling*. Stage Z is the *final action* that terminates the sequence.

The temporal character of this schema will be found useful later on in explaining many forms of complication, such as the overlapping of stages Y and Z, which at first sight would seem to negate the essentially parenthetic nature of feeling.

action begins, although in actual experience there is generally no such sudden shift.

It will be seen that this serial arrangement provides a preliminary "bodily expression" as accountable for feeling, which is the main contention of the followers of James; but that it also supplies a basis for the apparently opposite idea of feeling coming first in time and being followed by expression. The temporal sequence in the latter, popular idea (which was also held by Darwin) really refers to stages Y and Z of the emotional process where feeling comes before the action; while the revolutionary sequence insisted on by James is valid for stages X and Y where feeling follows and accompanies the attitude. It all depends on what portion of the process comes under the focus of attention as to how the sequence is described, since up to now the single term "expression" has been indiscriminately used to cover both bodily attitudes and actions.

Aside from the very general usage of the word *expression* in such a way as to obscure the sequence of events, the term also may, and often does, include the notion of communication. Thus the "expression of emotions" frequently means, not only visible attitudes and actions, but also the intention of the attitudes or actions to influence or make an impression on some other person. The "expression" in this sense becomes equivalent to a method of conveying information, and is in fact a kind of language, whether spoken words are used or not. In some form it is essential to every social situation and must occur whenever two or more individuals are met together.

As a matter of fact it is often very difficult to tell at exactly what point the social or communicative aspect of expression enters in, because the same behavior that serves the purpose of communication is often serving other purposes as well, of which the individual may or may not be conscious. For example, an angry attitude may be considered as conveying a feeling of resentment; but it is also an actual preparation for the act of striking. Similarly a disgusted attitude may be considered as conveying displeasure, or distaste; but it also forms an actual preparation for the act of retching or rejecting food (1). There was a widespread struggle with this complication going on among psychologists of the last century, and Darwin was led to remark in the introduction of his *Expression of the Emotions in Man and Animals* that "many writers consider the subject of Expression inexplicable." Darwin's (2) own efforts to clarify the subject were not especially successful, in spite of all the invaluable new material he brought to light, because of his primary failure to distinguish between expression in the form of action and expression in the form of motor attitude, and his repeatedly implied belief that the "emotion" comes before the expression—which according to the present thesis is only part of the entire picture.

The various current misconceptions and incomplete conceptions of emotion are not all due however to the vagueness with which the term "expression" has been used, both by psychologists and people generally. There are other concepts that will need revision in order to permit clear thinking on the subject, and one of these concerns the motor attitude in its relation to action. Dewey (3) has written, for example, "Certain movements, formerly useful in themselves, *become reduced* [1] to tendencies to action, to attitudes," and he uses this idea in connection with emotion generally, in a way that shows an appreciation of the rôle of motor attitude as responsible for feeling

[1] Italics ours.

which is in harmony with the present theory.[2] To understand the sequence in the stages of emotion, however, the attitude must be thought of not primarily in terms of reduced or lessened movement, but rather as uncompleted movement, or movement in suspense. It indicates an actual delay in the reaction, and thus anticipates a final stage that terminates the process.

The idea of movement being reduced or lessened in connection with emotional expression is not of course original with Dewey. It is found throughout Darwin's writings on emotion, and also in the works of Spencer; and is a perfectly legitimate conception in many cases, especially as applied to certain gestures and expressions of the face. But it ignores the push that lurks in attitude—as if it were a tightly coiled-up spring—which gives the individual his feeling of "suspense." The forward flow of the emotion is obscured—grounded by this conception—and the dynamic nature of the tendency as a going concern is lost to view. Accordingly, it seems that Dewey and others, in taking over this concept of "reduced" movement from earlier writers, have helped perpetuate a static and somewhat sterile orientation so far as yielding any satisfying explanation of the *feelings* of emotion is concerned. The more dynamic concept of motor attitude here presented, on the other hand, provides a reasonable explanation not only for the feeling of suspense, and all that this entails of waiting and anticipation, but also for the feelings of direction and intention which make up the subjective experience known as "mental attitude."

The feeling of mental attitude can thus be thought of as part of the consciousness of motor attitude. It belongs in stage Y of the sequence, and needs to be distinguished with the greatest care from what is sometimes called the *latent* attitude, which is a neural organization existing in the central nervous system as "predisposition" to the sequence X Y Z, and never conscious under any circumstances whatsoever. This latent attitude is actually a neural readiness within the individual to respond in a particular way to a particular object or situation; while the mental attitude depends upon the motor attitude—that is, on X, which is the initial step in all response.

The sequence can be now extended backwards to include the latent neural organization, P, which we shall call *predisposition* in order to distinguish it from any part of the response, to which it does not properly belong.

[2] Various writers have touched on this idea of motor attitude as responsible for feeling, but none, so far as we have been able to ascertain, have held to it consistently, or developed it to the point of general usefulness.

The study of predisposition, in connection with the series X Y Z, is essential to the general study of attitude. It definitely does not come under the heading of emotion, however, since it is neither feeling nor expression, and can accordingly be only touched on here. From the present point of view the important thing is to begin to think in terms of *active process,* and become familiar with a fundamental sequence (as indicated in figure 1) that clarifies the interplay of feeling and expression by uncovering elementary relationships between them. By introducing P as a preliminary phase, we may note in passing that a sequence is also provided to explain three different phases of "attitude" with which psychology is daily getting to be more and more concerned. These are the *latent,* P; the *motor,* X; and the *mental,* which is part of Y, and corresponds, as we have said, to feelings of direction and intention.

We are now in a position to consider very briefly the remaining parts of Y—namely those feelings coming from the various organic changes (of heart-action, breathing, gland-secretion, etc.) which necessarily ac-

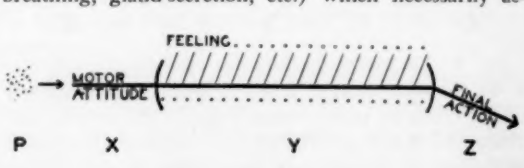

FIG. 2

company any preparation for bodily exertion. In low-grade emotional experience, these feelings of organic change tend to obtrude themselves in consciousness as vague suspense, excitement, anxiety and restlessness, without an adequately oriented mental component to whip the process into shape and give it *point.* For it is only in their relation to the mental attitude with its awareness of intention, that any such feelings (of physiologic changes) ever become intelligible. In short, a clear-cut mental attitude is necessary to give the sense of aim and purpose, so that the crudely oriented feelings of suspense and restlessness acquire "meaning."

The process of sharpening the focus of mental attitudes of orientation and intention, by bringing these aspects of low-grade motor attitude up into cortical awareness, is part of modern psychiatric method. This sharpened focus is what gives the person insight into his hitherto submerged behavior pattern and enables him to become self-critical, both as regards his aim and method of achieving it.

In dealing with submerged behavior patterns, however, there is always more than just one single attitude to be considered, and this brings up the subject of conflicting attitudes (including frustrations and repres-

sions), which up to now have not been mentioned for the following reason. Here we are concentrating on delayed activity in its relatively *uncomplicated* form, in order to abstract the general sequence P → X Y Z as a fundamental neuro-muscular pattern. For this purpose it has been necessary to ignore the numberless varieties of predicament that grip the individual when primary attitudes are interrupted and interfered with by secondary ones—causing confusion in the realm of feeling, and awkwardness of action; and very often bodily distress as well.

The point to hold in mind in connection with the present thesis is that all such conflict begins in stage X of the sequence, and is due to actual mechanical incompatibility between preparatory states of tension. Thus is can lead to physical disorder through prolonged interruption of physiological function; and to mental disorder through overlapping orientations which are beyond the power of the individual to disentangle because they fail to reach the level of cortical awareness where insight could begin to penetrate.

Since mental disorder begins with overlapping motor attitudes which produce embarrassment and inability to function, it is both important and encouraging to bear in mind that *thinking* has originated in the very same dilemma. In fact, the place of thought, considered as a device for simplifying and resolving complex situations, can now be brought into the sequence. The preliminary registration of feelings provides the ground-work, or matrix, for more subtle forms of cerebration where symbols are employed—somewhat as they are in algebra—to facilitate the handling of problems that have become too complicated to solve without them.

Thus thinking would fit into the sequence as a further development of stage Y. It would always be accompanied and reinforced by feeling, which in turn would be dependent on motor attitude, maintained as preparation for muscular activity. It can be introduced into the diagram as Y′, in the following manner:

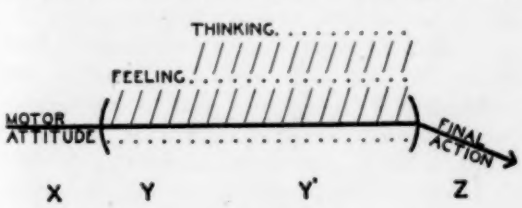

FIG. 3

The fact that feeling and thinking do not always terminate when action begins does not invalidate the fundamental sequence, for this is due, according to the present thesis, to an overlapping of motor attitudes, which is a form of complication not represented in the diagram.

It is hoped that the present concept, which is based on certain simple and fairly obvious relationships, mechanical and temporal, of attitude to action, will throw open a new approach to the consideration of emotional patterns in general; and will be of value in explaining seemingly divergent theories of emotion, built up in efforts to bring order out of the welter of observations reported on this classic subject. Not by destroying previous approaches, but only by harmonizing and clarifying them, can we hope to arrive at any form of order that all psychologists will readily accept.

In this preliminary study there has been no move to pin the term emotion down by definition, or even to suggest exactly what it should or should not include. This is primarily an orienting paper—to isolate a fundamental sequence pattern which is common to all behavior where feeling is a factor, and which appears to be a veritable "action-system," inherited by the human species from its predecessors in the evolutionary scale.

By starting with this sequence as a basis, *emotion*, which, no matter how it is defined, has always been concerned with interplay between the "body" and the "mind," becomes more readily explainable; and the baffling body-mind relationships, being reformulated in terms of process, begin to lose some of their age-long mystery.

SUMMARY

A neuro-muscular sequence is offered in which the "expression" of emotion is first divided into two serial phases of motor attitude and action.

Feeling is then shown as belonging to an intermediate stage, being dependent on a delay occurring after the assumption of a preliminary motor attitude. It is actually *the feeling of the motor attitude* and indicates a holding up of final adequate activity.

This sequence in three stages is suggested (a) as explaining the seemingly divergent points of view of Darwin, James and Dewey; and (b) as offering a concrete basis for the study of conflicting motor attitudes and resulting psychosomatic symptoms.

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ANNOUNCEMENT

The Albany Society for the Advancement of Psychosomatic Medicine has been organized as an independent group of physicians within the area of Albany.

The chief objective of this Society is the development of the psychosomatic point of view in the approach to clinical problems and therapeutic practices. At the outset, the educational program will be carried out by dinner meetings of the membership, case presentations and research projects.

The officers are:

President, Dr. Robert A. Faust, Instructor in Medicine, Albany Medical School
Secretary, Dr. Alva Gwin, Psychiatrist and Psychoanalyst
Chairman of the Executive Committee, Dr. Otto A. Faust, Professor of Pediatrics, Albany Medical School
Consultant, Dr. Clinton Preston McCord, Psychiatrist and Psychoanalyst

Among the members of the Executive Committee are Dr. Paul B. Brooks, Deputy State Commissioner of Health; Dr. Newton J. T. Bigelow, Deputy State Commissioner of Mental Hygiene; Dr. William Kaufmann, Pathologist and Specialist in Tropical Medicine; and Dr. Morton L. Levin, Assistant State Director of Cancer Research.

This group has expressed the hope that at some future date the Albany Society for the Advancement of Psychosomatic Medicine will become one of the first regional societies of the American Society for Research in Psychosomatic Problems.

QUANTIFICATION OF PSYCHOPHYSIOLOGICAL MEASURES

MANDEL SHERMAN AND HUDSON JOST *

In previous publications (13, 18) reports were made of the physiological reactions to frustration which were obtained on normal, neurotic, and psychotic subjects. The conclusion was reached that the frustrability of an individual is related to his personality and to his emotional lability. No attempt was made, however, to measure quantitatively the physiological reactions which were considered indices of frustration.

This paper is a report of the quantitative differences between the reactions of normal and maladjusted children. The scores of the measures on the maladjusted children were compared with those of the normal children through the use of standard scores, and a composite score was obtained. For example, by correlating the measures of the electroencephalograms (EEG) with the measures of autonomic nervous system activity an index was obtained which was a composite measure of the activity of the central and autonomic nervous systems.

The subjects of this study were 25 well-adjusted boys from the University Elementary School, ranging in ages from 9 to 13, 20 emotionally maladjusted children, of whom 16 were diagnosed as neurotic and 4 as psychotic. The subjects were told that they would be given words to which they were to respond by the first words that came to their minds, and they would also be given a number of arithmetic problems.

The subjects were seated in a darkened room and the experimenter in an adjoining room, and the physiological responses were measured for approximately five minutes while the subjects were resting. Following this period, a series of 20 neutral and emotional-provoking words and 6 arithmetical problems were presented. A series of three words was given followed by an arithmetical problem. The arithmetical problems increased in difficulty, but were kept within the limits of their abilities at first. Then another series of three words were given, followed by a more difficult arithmetical problem. This was followed by another series of three words and a still more difficult arithmetical problem. The fourth arithmetical problem was also too difficult for any of the subjects to respond to correctly. At regular intervals during the presentation of the words and problems, four sudden auditory stimuli were given, loud noises made by dropping a tin pan. This was done for the purpose of sensitizing the subjects as well as to measure their reactions to such stimuli. The order of presentation was organized in such a way that the individual could not anticipate the kind of stimulation which he would receive. Following the last stimulus, a five-minute record was obtained while the subjects were in a resting state.

The following measures were recorded simultaneously: brain potentials, blood pressure changes, respiration, galvanic skin resistance, heart rate, and hand tremor. The methods of recording and measuring most of these physiological reactions have been described in the literature (4, 5, 12, 23). As will be discussed later, several new methods of scoring were used, however. The reaction to word stimuli has also been extensively studied previously. Rosanoff and Woodrow (17) made important studies of this type. Smith (20), in his use of the Kent-Rosanoff list of words, showed that the psychogalvanic reactions of normal persons are more intense to emotionally toned words than to neutral words. Psychogalvanic responses have also been used as physiological measures of autonomic nervous system activity in studies of neurotic and mentally abnormal persons. In 1926 Syz (21) showed that the galvanic curve was more regular in normal individuals than in schizophrenic or depressed patients. Odegaard (16), among others, showed that patients with well formed psychotic states were less reactive than neurotic persons. The most extensive studies were made by Darrow (6) and his associates. They found that large changes and slow recovery were associated with emotional instability. Depressed and paranoid patients showed low galvanic resistance levels. The slight galvanic responses of psychotic patients supposedly indicated diminished autonomic nervous system activity. Hoch (10) and his associates published a critical review of the relationships which had been reported in the literature concerning the psychogalvanic skin responses of psychotics and neurotics. They concluded from this survey and from their own work on 100 psychotic and 100 normal subjects that the psychotic individual was less reactive as measured by the galvanic skin response than was the normal and that the neurotic was more reactive.

Respiratory changes have also often been used to measure different emotional states. In general, it has been shown that normal individuals show more stable respiratory curves than neurotic or psychotic patients. On the other hand, Thompson and Corwin (22)

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found greater respiratory regularity among chronic schizophrenic patients than among normal persons.

Heart rate has been commonly employed as an index of emotionality. A recent study by Whitehorn and Richter (24) showed that there were distinct differences in the stability of the heart rate in neurotic, psychotic, and normal subjects. The psychotic subjects had the most stable heart rate, and the neurotic group had the most unstable rate. Another recent study was reported by Armstrong (1) who examined 700 Air Corps candidates. He found extremely high correlations (between .88 and .98) between emotional stability and cardiovascular reactivity.

2. Per cent change of intensity of alpha waves. The frequency was obtained for each subject for five seconds before a stimulus was given, for the time during the stimulus and the response, and for five seconds after the response. Thus it was possible to obtain a basic score, a stimulus score, and a recovery score. The intensity score was obtained by squaring the average amplitude of the alpha waves during one second, and multiplying by the frequency per second. This gave a less variable statistical measure than the average amplitude alone.

3. Standard deviation of alpha wave frequency from second to second, EEG.

TABLE I

COMPARISON OF NORMAL, PSYCHOTIC, AND NEUROTIC SUBJECTS ON NINE PHYSIOLOGICAL VARIABLES

Measure	Normal		Psychotic		Neurotic	
	Mean	Per-centile	Mean	Per-centile	Mean	Per-centile
1. EEG: Dominant alpha wave frequency	9.6	50	10.3	18	8.9	83
2. EEG: Per cent change of intensity five seconds before to five seconds after stimulation. Average of total responses	+2.6	50	+6.3	39	—16.6	90
3 EEG: Per cent change of intensity from five seconds before stimulation to period of response. Average of total responses	15.0	50	15.6	50	34.4	77
4. EEG: Standard deviation of dominant alpha wave frequency from second to second	.63	50	.53	32	1.14	98
5. Log conductance change of galvanic skin resistance from beginning to end of experimental period	—.37	50	—.23	42	—1.57	92
6. Respiration: Number of respiratory movements per minute	23.2	50	21.7	20	26.3	85
7. Respiration: Standard deviation of number of respiratory movements from minute to minute	.85	50	.66	9	1.27	88
8. Respiration: Standard deviation of respiration amplitude	2.1	50	1.4	4	2.8	86
9. Heart rate: Number of beats per minute	42.3	50	33.1	2	40.9	48

In the past six years a large number of studies have been reported on the results of electroencephalographic measures of emotional stability. Jasper (12) and his co-workers reported abnormal brain waves in 71 per cent of a series of children who were diagnosed as behavior problems. Lindsley and Cutts (14, 15) also reported electroencephalographic differences between abnormal and behavior problem children. The behavior problem children showed a greater frequency of slow waves, that is, between 2 and 5 per second, and abnormal activity induced by hyperventilation. They suggested that these electroencephalographic changes showed evidence of a disturbance of cortical function, which was probably correlated with the behavior disorders.

The following measures were used to compare the reactions of the subjects:

1. Dominant alpha wave frequency, EEG.

4. Log conductance changes. (Changes in skin resistance plotted on a logarithmic scale). This is usually considered a fairly accurate measure of autonomic nervous system activity.

5. The number of respiratory movements per minute.

6. The standard deviation of the number of respiratory movements per minute. This was considered a measure of the variability of respiration.

7. The standard deviation of the respiratory amplitude, which is another index of the stability of respiration.

8. The pulse rate.

Table I shows the comparative scores of the 25 well-adjusted, 4 pyschotic and 16 neurotic subjects used in this study. The mean of the well-adjusted is 50 per cent. According to the scoring procedure used, the lower percentile scores indicate more stable reactions. It should be noted that the four psychotic subjects

rated below 50 per cent in all the measures except number 3 and this was at the 50 per cent level. The neurotic subjects, on the other hand, were most unstable physiologically and rated above 50 per cent in all of the measures except number 9.

The various measures and scores were transposed to standard scores, (ordinarily symbolized as Z).[1] The intercorrelations of the scores of the emotionally disturbed children are shown in Table II. The dominant alpha wave frequency shows a high correlation with only two of the other measures, the two measures of the variability of respiration. The individuals with the most stable respiratory pattern showed a faster alpha rhythm. The two measures of change of intensity of the brain potentials are closely related to each other (correlation of .67) and, in general, also closely related to the other physiological variables. The coefficient of correlation with the deviation of the dominant frequency was .66 and .43, with log conductance change, .42 and .54, and with changes in the number of respiratory movements, .54 and .36.

The deviation of the dominant alpha wave frequency was found to be the best single measure of emotional stability. It correlated .66 with the per cent change from before to after stimulation, .71 with the log conductance change, and .62 with the standard deviation of respiration amplitude.

The number of respiratory movements per minute did not correlate highly with any of the other measures. The speed of the heart rate showed a correlation of .52 with the standard deviation of the respiratory amplitude. The variability of heart rate is related to EEG changes during reaction, .50, and to log conductance change, .52. This indicates that a more stable heart rate is associated with decreased EEG activity blocking and reduced galvanic change. Correlations in the analysis larger than .43 are at the .05 level of reliability and those above .54 are at the .01 level. Fifteen correlations in Table II are above the .05 level of reliability which is an indication of the interrelationships between the autonomic and the central nervous systems and the homogeneity of responses.

TABLE II

INTERCORRELATIONS OF PHYSIOLOGICAL VARIABLES
(Emotionally Disturbed Children)

	1	2	3	4	5	6	7	8
1. EEG: Dominant alpha wave frequency								
2. EEG: Per cent change of intensity from five seconds before to five seconds after stimulation. Average of total responses	.191							
3. EEG: Per cent change of intensity from five seconds before stimulation to period of responses. Average of total responses	.068	.667						
4. EEG: Standard deviation of dominant alpha wave frequency from second to second	.210	.655	.426					
5. Log conductance change of galvanic skin resistance from beginning to end of experimental period	.247	.415	.547	.714				
6. Respiration: Number of respiratory movements per minute	.316	.024	.210	.381				
7. Respiration: Standard deviation of number of respiratory movements per minute	.582	.537	.356	.624	.381	.180		
8. Respiration: Standard deviation of respiration amplitude	.517	.249	.070	.510	.347	.211	.672	
9. Heart rate: Number of beats per half-minute	.446	.062	.059	.228	.300	.378	.233	.515

The scores obtained on the various measures were transformed into standard scores. Table III shows the composite standard score for fifteen of the emotionally maladjusted children. As seen in this table, subjects J. B., J. F., K. B., and R. B. show a positive score. This indicates physiological stability. The remainder of the subjects showed a negative score, indicating unstable physiological activity. All the subjects who

TABLE III

COMPOSITE STANDARD SCORES (z) FOR THE EMOTIONALLY MALADJUSTED CHILDREN

Sub.	z Score	Sub.	z Score	Sub.	z Score
H. G.	−1.09	J. B.	− .40	J. S.	− .71
J. B.	+1.20	K. B.	+ .53	R. A.	−2.18
C. O.	− .82	R. B.	+ .27	H. B.	−1.01
H. R.	−1.19	W. C.	−1.20	D. J.	−1.51
J. F.	+ .27	W. Mc.	− .59	H. N.	−1.60

[1] $Z = \frac{X - M}{s}$, in which X = raw scores, M = mean of scores, s = standard deviation of distribution.

showed a negative score were characterized clinically as showing neurotic personalities manifested by emotional instability, irritability, restlessness, rebelliousness, school maladjustments, and somatic complaints. Observations showed that these individuals were sensitive to frustrations and responded with intense emotion to thwarting. The subjects who showed a positive score had been diagnosed clinically as schizophrenic. Their behavior correlated well with the physiological measures. They were emotionally rigid, relatively insensitive to frustration and thwarting, and showed few, if any, emotional disturbances of the type seen in neurotic individuals. Their responses were slow, and it was difficult to arouse them emotionally even in situations in which their personal failures were called to their attention.

The electroencephalograms of the subjects appeared to be fairly good indices of their emotionality. The neurotic individuals showed an atypical alpha wave rhythm, whereas the normal and the schizophrenic individuals showed a much more regular and normal alpha wave rhythm. This was true not only in the periods of stimulation by words, noise, or arithmetical problems, but also in the resting states. This may be due to the neurotic individual's physiological tensions, resulting in the diminution of brain wave activity. It is well-known that many types of sensory stimuli reduce brain wave activity, and the diminished alpha wave activity of the neurotic person may in part be due to interference by internal stimulation. Although only four schizophrenic subjects were tested, it was noticed that the more serious the schizophrenic condition, the greater was the physiological stability. It is possible that the extent of rigidity of physiological activity may be a good index of the severity of the type of mental abnormality which these subjects represented.

SUMMARY

Electroencephalographic and photopolygraphic recordings were obtained on 25 well-adjusted and 20 emotionally maladjusted children for a 15-minute period during which words, arithmetical problems and sensory stimuli were presented.

The following physiological measures were used: dominant alpha wave frequency, per cent change of intensity of brain potentials during and after stimulation, deviation of alpha wave frequency from second to second, log conductance change, speed of respiration, regularity of respiration, and pulse rate. The scores of the emotionally maladjusted children were compared with those of the normal children by the use of standard scores. This method made it possible to obtain composite scores of physiological reactivity. Additional validity of the physiological patterns was demonstrated by the intercorrelations of the various measures.

In general it was found that the neurotic child was much more unstable physiologically than the normal, and that the psychotic child was more stable than the normal.

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SOCIAL AND ENVIRONMENTAL FACTORS IN MEDICINE

The teaching of the social and environmental factors in medicine, as now carried on in medical schools in this country, is being studied by the Association of American Medical Colleges in cooperation with the American Association of Medical Social Workers. A grant to finance the study has been given by the Milbank Memorial Fund. A committee of twenty-five physicians and medical social workers who are engaged in this teaching has been formed to direct the study, under the name of the Joint Committee on the Teaching of the Social and Environmental Factors in Medicine. The Co-Chairmen are: Dr. J. A. Curran, President of the Long Island College of Medicine, and Miss Eleanor Cockerill, Associate Professor of Social Case Work at the School of Applied Social Sciences, University of Pittsburgh. A centrally located project subcommittee has been set up under the chairmanship of Dr. J. E. Roads, Asisstant Professor of Surgical Research and acting director of the Harrison Department of Surgical Research, University of Pennsylvania School of Medicine. The Executive Secretary of the study is Miss Harriett M. Bartlett, 49 Fruit Street, Boston 14, Massachusetts.

It is the aim of the study to bring together and analyze the experience of a group of medical schools in introducing students to the social and environmental components in medicine. Visits to selected centers will be made by members of the committee. The study is expected to last through 1945, at the end of which time a report summarizing the findings will be prepared.

PERSONALITY AND PSYCHOSOMATIC DISTURBANCES IN PATIENTS ON MEDICAL AND SURGICAL WARDS: A SURVEY OF 450 ADMISSIONS *

BELA MITTELMANN, ARTHUR WEIDER, KEEVE BRODMAN, DAVID WECHSLER, AND HAROLD G. WOLFF

WITH THE TECHNICAL ASSISTANCE OF MARGARET MEIXNER

Personality and psychosomatic disturbances in association with infection and trauma may influence the rate and degree of recovery. In the armed forces prolonged convalescence and sustained decrease in effectiveness are especially significant. For this reason a survey was made of the incidence of personality and psychosomatic disturbances in patients on medical and surgical wards.

METHOD

Four hundred and fifty patients on orthopedic; ear, nose and throat; respiratory; gastrointestinal; circulatory; general medical; urological; and surgical wards were examined. They were a selected group only in that all were men between the ages of eighteen and forty-five.

Patients were examined during one or more psychiatric interviews concerning symptoms, their duration, intensity and the circumstances under which they developed; work history; home situation; childhood history; and the presence or absence of major personality and psychosomatic disturbances.

The disturbances uncovered by interview, were appraised as mild, moderately severe, or severe, on the basis of the outlook for return to useful activity. They were considered severe or moderately severe, if at the time of interview the personality disorder precluded full activity, and mild, if efficiency was likely to be somewhat reduced, or convalescence retarded.

RESULTS

Of the 450 patients examined, forty-five or ten per cent were appraised as having severe or moderately severe personality disturbances, and ninety or twenty per cent as having mild personality disturbances. The incidence varied from ward to ward, and in one (for disorders of circulation) the total was as high as seventy-five per cent. These personality disturbances were in large measure unrecognized by the physician in charge as factors complicating illness and convalescence.[1]

The majority of persons interviewed expressed eagerness to leave the hospital as soon as possible. Of those who had experienced catastrophic situations, the majority had been free of significant personality disturbances before the episode. The remainder had showed evidence of personality disturbance before the experience and "broke down" after it.

Table I shows the incidence of various types of personality disturbances in 135 of the 450 patients interviewed. Most patients had a variety of complaints, but they were classified according to the most disturbing symptom. This group (135) includes all those with mild, moderately severe and severe personality disturbances. For the purposes of this study these problems were classified as follows:

A. Pre-existing personality disturbances aggravated by infection or trauma (30%).
B. Personality disturbances precipitated by or first becoming evident in association with infection or trauma (37%).
C. Personality disturbances in patients with serious defects in structure or function (20%).

* From the New York Hospital and the Departments of Medicine (Neurology) and Psychiatry, Cornell University Medical College, and the Psychiatric Division, Bellevue Hospital, New York, N. Y.

The work described in this paper was done under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and Cornell University.

This study was aided by a grant from the Josiah Macy Jr. Foundation.

Read by title before the Meeting of the Association for Research in Nervous and Mental Diseases, New York, Dec. 15 and 16, 1944.

[1] A quick, reliable method is available for the detection of patients with personality and psychosomatic disturbances serious enough to modify the course of illness. The Cornell Selectee Index—Form N (1) is a self-administered, pencil and paper procedure which can be given to any number of individuals simultaneously. It can be completed in ten minutes and scored within one minute with the use of a simple stencil. The simplicity of this instrument makes it valuable for use in large scale surveys while the information uncovered by it can be used in orienting the physician giving a psychiatric interview. Test blanks and scoring materials are available to responsible agencies on request to the authors at Cornell Selectee Index Project P206, Cornell University Medical College, 1300 York Ave., New York 21, N. Y.

D. Personality disturbances in patients without gross structural defects but with excessive complaints and disturbance of function (8%).

E. Trauma resulting from personality disturbances (4%).

TABLE I

TYPES OF NEUROPSYCHIATRIC AND PSYCHOSOMATIC DISTURBANCES FOUND IN 135 OF A TOTAL OF 450 PATIENTS INTERVIEWED

Psychoneuroses	
Anxiety states with predominant symptoms of	
Anxiety	26
Depression	9
Sleepwalking	1
Enuresis	1
Gastrointestinal complaints	19
Back and foot pain	5
Cardiovascular dysfunction	4
Conversion Hysteria	1
Hypochondriasis	3
Neurasthenia	1
Startle Reaction	14
Psychosomatic Disturbances	
With readily discernible psychopathology	
Peptic Ulcer	10
Asthma	3
Hypertension	5
Headache	14
Colitis	1
Without readily discernible psychopathology	
Peptic Ulcer	3
Asthma	3
Hypertension	1
Colitis	1
Psychopathic Personalities	
Overdependent	5
Alcoholic	3
"Troublemaker"	1
Suspicious type	1

A. Pre-existing personality problems aggravated by infection or trauma.

Case 1: A man with headaches following pneumonia feared he had the same illness as his invalid father.

A 23-year-old man complained of headaches with nausea and vomiting during convalescence from pneumonia. The patient's anxiety increased as his symptoms prevented his discharge from the hospital. During interview it was revealed that the patient had suffered a mild head injury three years previously, and had had occasional mild headaches thereafter. His father had had severe attacks of headache and nausea for fifteen years following a railroad accident. The son had always been disturbed by his father's suffering. He had been performing satisfactorily and liked his work. When he became sick he had to leave his job and was lonely without his comrades. He was eager to return. It is to be noted that his first headache was an accompaniment of fever. However, during his depressed state the headache reminded him of his earlier head injury and aroused his old fears that he would have the same difficulties his father had had for so many years.

It was explained to the patient that his headaches were not due to damage to his brain, but that they were connected with his anxieties about his father and himself. Assurance was given that if he could dispel these anxieties his headaches would stop. He was also told that he should not brood but should "throw" himself into useful activity such as reading about problems that interested him, and acquiring new manual skills. In a week the patient's headaches and nausea had ceased and he subsequently left the hospital.

B. Personality disturbances precipitated by or first becoming evident in association with infection or trauma.

Case 1: A man with nephritis following sore throat had resentment about sulfadiazine therapy and guilt feelings about gonorrhea as causative factors.

A 24-year-old man who had been performing effectively in his work and social relations, complained of "sore throat." This tonsilitis was successfully treated with sulfadiazine but nephritis developed and he complained of pain all over his body. Moreover, he felt guilty and worthless and he was both fearful and resentful for the following reasons: he had contracted gonorrhea a year before the present illness and despite the fact that he was cured in a short time he feared that his nephritis might be a result of the gonorrhea. He was resentful because be believed that his kidneys had been damaged by the sulfadiazine which had been given him for his infections. Explanation and reassurance dispelled this man's complaints.

Case 2: A man with traumatic neurosis following the sinking of his ship, whose condition was unaffected by pneumonia.

A man who had performed adequately in his work and social relations, was unaware of significant personality difficulties until after the ship on which he was a passenger, was sunk. During the ensuing year he experienced repeated dreams of catastrophe, startle reactions and tremor. Although his anxiety and tremors interfered with his work he did not consult a physician until he became ill with pneumonia which brought him to the hospital. His traumatic reaction apparently had

not been made worse by his illness, and it was during psychiatric examination that its symptoms were disclosed. These symptoms were ameliorated by repeated discussion of their causes and of the conflict that lay behind them.

C. Personality disturbances with serious defects in structure or function. (Psychosomatic disturbances, *e.g.*, hypertension, which may become associated with structural defects are included in this group.)

Case 1: A conscientious, "hard driving" engineer, anxious about his family and resentful about his assignments, developed a duodenal ulcer.

A 35-year-old man was admitted to the hospital with pain in the abdomen, having its onset about two hours after meals. X-ray examination established a diagnosis of duodenal ulcer. This patient had been for many years a conscientious, ambitious, "hard driving" individual. He aimed to do his job not only well, but flawlessly. He worked effectively as an engineer. He was, however, very much concerned about his family because they could not live as well after he had accepted an assignment away from home as before. He felt that he should have provided better for them. He also worried about his health. His stomach complaints appeared when, instead of getting a vacation as he had expected, he was transferred to an urgent job. He was resentful and disappointed and worried all the more about his family and his new duties. It was in this setting that his complaints began. The management of his illness of necessity had to include consideration of his personality problems.

The foregoing is in contrast to the next group in which there was no structural defect.

D. Personality disturbances of long duration in patients without gross structural defect but with excessive complaints and disturbances of function.

Case 1: A timid man, overdependent on his mother, had burning in his stomach, aggravated by a change in his environment.

A man complained of "gas," pain and burning in the stomach after eating. He had had a drastic change in his environment three months prior to his admission. During this time his complaints were persistent and had become incapacitating. He said that he had been on a special diet consisting only of milk, white bread and vegetables. He became sensitive to noise and exhibited startle reactions. On physical examination no structural defect was found. It was revealed that he had had complaints of a similar kind for at least six months before accepting his new job. He had always been overdependent on his mother, had never been away from home and never ate in a restaurant because it made him sick. The prognosis as regards usefulness, in his present situation, was poor and therapeutic efforts on the part of the physician probably would have been difficult and of questionable result.

E. Trauma resulting from personality disturbance.

Case 1: A man, who walked in his sleep, fell out of his bed and broke his leg.

A 21-year-old man had been sleep walking since puberty, about once every two weeks. One night about two months after a change in his work situation, during somnambulism, he walked out of his bed and fell, fracturing his femur. This was the first serious injury he had sustained while sleep walking.

Trauma in other instances was connected with personality disturbance in the following ways: as a result of the disturbances the patients were impulsive, tense in musculature, and were given to sudden jerky movements. Others were awkward in motion and behavior, and still others, whether as a result of insomnia or discomfort from gastrointestinal dysfunction or headache, were less alert. Those with depression were preoccupied, inattentive, and careless.

DISCUSSION

Psychodynamics of the Personality Disturbances Found in This Series of Patients with Infection and Trauma

Nature of Precipitating Stress: In patients with personality and psychosomatic disturbances the threat to body safety, attitudes about the family, chiefly anxiety, feelings of abandonment, rejection, frustration, resentment, hostility and sexual conflicts played dominant roles in bringing about the "breakdown."

Outstanding moods and other reactions were as follows: (1) fear of not "measuring up," together with feelings of hoplessness due to physical disability; (2) fear of the illness because it represented a threat to life; (3) loneliness and anxiety because of separation from the family and anxieties about situations at home—feelings which are often a continuation of the anxiety felt in relation to the parents in childhood.

The patients attributed their fears and feelings of inadequacy to their physical illness. Some gave the impression that there was a deep-seated and repressed guilt because of an unrecognized desire to take advantage of their disability and thus avoid responsibility. Superficial dissatisfaction with the hospital care did not increase the intensity of the above reactions, whereas when there was deep resentment about the care there was an increase in feelings of hopelessness.

Patients with personality and psychosomatic disturbances exhibited conflict and guilt feelings. In some these feelings were apparent to the patient. Especially was this true in those who felt a need of group approval and a desire to share group ideals as represented by acceptance of responsibilities and living up to the expectations of their families, superiors and themselves. The conflict resulted from a desire to be cared for in the hospital and to be protected, which stood in contrast to their ideals just mentioned. On the other hand when need for group approval and desire to share group ideals was not a dominant aspect of the character, the conflict which resulted, between ideals and desire for protection, was not recognized by the subject.

A few psychopathic personalities displayed defiance toward accepted social values, and their feelings of rejection, guilt, anxiety and frustration expressed themselves in diffuse hostility. The pervading reaction of hostility of the psychopathic personality was not constructively altered by any form of hospital care or special attention.

SUMMARY

1. By means of psychiatric interview a survey was made of 450 admissions to medical and surgical wards. Twenty per cent were classified as having mild and ten per cent as having severe, neuroses.

2. These disturbances were grouped as follows:

A. Pre-existing personality problems aggravated by infection or trauma (30%).

B. Personality disturbances precipitated by or first becoming evident in association with infection or trauma (37%).

C. Personality disturbances with serious defects in structure or function (20%).

D. Personality disturbances in patients without gross structural defect but with excessive complaints and disturbances of function (8%).

E. Trauma resulting from personality disturbances (4%).

3. The patient's difficulties arose in connection with the threat to bodily safety, frustration of dependency needs, hostility, sexual problems and the failure to live up to high standards of achievement. All patients had conflict between group ideals and desire for protection. In some instances the individual was aware of it, in others he was not. In psychopathic individuals feelings of frustration and guilt expressed themselves in diffuse hostility and in defiance of accepted social ideals.

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GROUP THERAPY TRAINING

A Training Institute in Activity Group Therapy for Children has been announced by the American Group Therapy Association, 228 East 19th Street, New York City. This will be held in New York and will cover from 12 to 14 hours a week. The tuition will be from $250.00 to $300.00 per year.

Selection of students will be made on the basis of education, experience and personality qualifications. Graduation from a school of social work, a recognized degree in psychology or psychiatry and 3 years of case work of acceptable standards are required.

The curriculum consists of a course in diagnosis; intensive study, analysis and interpretation of records; observation of groups in action; seminar in other types of group therapy; review of the literature; administration, integration and record keeping.

The training will be continued a second year and students will direct groups in their own agencies and localities under supervision.

REPORT OF THE COMMITTEE ON INFANCY AND EARLY CHILDHOOD OF THE AMERICAN SOCIETY FOR RESEARCH IN PSYCHOSOMATIC PROBLEMS

ATTITUDES OF WOMEN TOWARD PREGNANCY AND THE NEW-BORN BABY*

Chairman: EDWARD LISS, M.D.

PANEL

ALFONS BACON, M.D. — MARGARET GERARD, M.D.
JEAN PRATT, M.D. — WARD SEELEY, M.D.
BENJAMIN SPOCK, M.D.

Dr. Liss: The subject for to-night represents a pioneer effort on the part of the psychiatrists, pediatricians and obstetricians to get together and make a continuity of something which is usually fragmented, and, inasmuch as all of life is a continuum, such an approach is vital if we are going to make any medical progress.

How did this concept come about? Sometime ago, in speaking to a well known pediatrician, he said, "You know, I spend three-quarters of an hour taking a history and one-quarter of an hour in examining my patient." That is quite a change from the type of pediatrics which goes back to the time when I began. Now the psychiatrist goes him one better. He not only spends one hour but he will spend hours on end trying to get a history which hangs together, which makes sense to him and brings to him some concepts of why the present condition came about. The dark ages of history taking go back to the period before the child was born. It seems rather far-fetched that we should concern ourselves with the period before the child has made its advent into this world, but the inter-relationship between physiology and psychology is so close that, of necessity, we must be interested in the physiology and psychology of the entire life period of the organism.

One investigation covered a continuous contact with two mothers who became pregnant during the period of therapy, and who reported every other day for conference for a period in one instance of eight months, and in the other instance for a period of seven months. It was an extraordinarily revealing experience and illustrated the constant dual sentiment of the average person toward pregnancy which we always regard as normal—the love component which stands out above all things, and a substratum of fear and concern which at times is very thinly disguised and at other times very deeply imbedded.

This element is something I think the obstetricians must, and I am sure do, bear in mind, that pregnancy brings out in every woman a number of conflicting emotions which she should be informed are quite normal. That, I think, is something which the obstetrician can definitely contribute, and if he brings comfort to the pregnant mother he brings comfort, shall I say, to the unborn child, and he brings comfort, too to the child when it is born.

Dr. Liss then called upon Dr. Jean Pratt asking him to speak on the question of voluntary and involuntary pregnancy.

Dr. Pratt: I am delighted to see the attitude of the average mother who comes to the office today as compared to a number of years ago. There was an expression that was fairly common years ago, namely, that, "I have been caught," which is scarcely ever heard today. The introduction of the contraceptive has done this for these mothers. It has given them an opportunity for planning their pregnancies and it has taken away a certain fear that had gotten out of bounds before that came about.

In discussing the contraceptive and its influence on the birth rate, statistics could show almost anything because there are so many factors that enter into birth rate. All we need to do is to look over in Europe today and inquire about the birth rate and then try to explain why the birth rates are falling as they are. Certainly it is not because of contraceptives.

* This meeting, held in Detroit on October 25, 1944, was planned for obstetricians and pediatricians for the purpose of re-appraising present-day practices in the care of new-born infants.

Statistically, I would not be prepared to say what contraceptives have done to the birth rate in this country, but in the patients that I see I am sure that there are no fewer pregnancies with the contraceptives introduced than there were before.

The knowledge that a woman can plan her pregnancy and can get away from that fear of being "caught," which was so often expressed years ago, has done a great deal to build up her morale and to give her a proper attitude toward pregnancy. It allows her to become pregnant with what seems to me a proper attitude, that it is a normal physiologic event and that it is the opportunity to fulfill the second most fundamental instinct in life, the first most fundamental instinct being the preservation of life, the second being reproduction. When such a fundamental instinct is thwarted I am sure you will hear from the psychiatrist that this is a very serious affair and we obstetricians see how valuable it is for the woman to be natural.

Dr. Liss: The emphasis on the biological destiny of every woman and its significance to the psychiatrist is something which I believe needs a great deal of elaboration. I think that Dr. Pratt's statement whether a child is wanted or is not wanted is of vital importance so far as the subsequent relationship of the mother is concerned with that child. Dr. Seely will next discuss normal fears in pregnancy and of pregnancy.

Dr. Seeley: It has been said here this evening that pregnancy and parturition are normal physiological processes. If that is the case it would be difficult to reason why women so fear it. It has been denied by no other than Dr. Lee, one of our famous obstetricians, who is now dead, that parturition is a normal physiological process.

It has been said that pregnancy is a parasitic disease. If a woman looks on pregnancy in this sense it is quite obvious that she has the right to be more or less concerned and have fear.

On the other hand, no matter whether we look at it as a normal physiological process or not, it cannot be denied that a woman is safer, for instance, in the city of Detroit today than she was ten years ago or twenty years ago. When I first came to Detroit the death rate was about seven per thousand. The first six months of this year in Detroit it was one and nine-tenths per thousand. If statistics mean anything, and we like to think they do, a woman should have less cause to fear pregnancy now than ever before. I think it goes farther than the actual fear of the process of parturition and the things that go with it that are unpleasant to her, because labor now-a-days has not only been shortened considerably, it has been made much more comfortable for the patient, and certainly, as I have already mentioned, much safer both for her and for her child.

On the other hand, there are certain things that do have weight with women aside from the actual question of morbidity and mortality. One of those is the blow to her pride that occurs when she becomes pregnant, with increasing enlargement of the abdomen. This may be upsetting to her vanity.

The question of the social and economic outlook for the family as predicated on one or more pregnancies is also interesting. In this respect we might say that of course the child that is wanted probably is born much more commonly to those parents who have planned for the child financially than is the child that just happens in the course of events.

While we believe that planned pregnancies are to be desired, recent studies along this line show that perhaps the greatest asset of a woman, so far as pregnancy and its outcome is concerned, is youth. We might say in this regard that pregnancies that are too well planned and spaced too well and too accurately may be even deleterious so far as the patient is concerned. Her greatest asset, so far as pregnancy and its outcome is concerned, as I have mentioned, is her youth. If she has her babies when she is young, regardless of whether she plans them or not, both she and her baby are safer and are better risks.

There is also always the question that comes up relative to the attitude of the husband to his wife during the period of pregnancy which the women resent very bitterly, especially if they have husbands who are not too considerate.

We know that a pregnant woman has many fads and fancies. Depressions are common, and an unkind word or a slighting remark or a joke during the course of a pregnancy aimed at, for instance, the patient's looks or her inability to do this or that, often upsets a pregnant woman much more than any of us would suspect. I think husbands need a course in pre-natal care as well as do their wives.

Dr. Liss: Which reminds me of a story of a woman I was asked to take care of, who went through her pregnancy normally but her husband developed morning sickness and had to be taken to his business in a cab each morning because he was so nauseated that he could not stand up—a complete reversal of roles.

Dr. Bacon will discuss his observations on labor and during the lying-in period. Dr. Bacon.

Dr. Bacon: I am going to attempt to enumerate a number of observations made during labor and in the days while the pregnant patient, or OB patient, is in the hospital. Many of the things I am going to say to you will be provocative.

One of the first observations in connection with

labor is the desire to get it over with. Your pregnant patient is often quite contented and satisfied until the last month; then we know how anxious she is to get the baby born. She becomes impatient with the weight and the embarassment of her appearance, and there is a certain worry concerned with labor which prompts her to wish it would hurry up and happen.

The question that worries many mothers is the danger in labor, but that has been minimized through the recent years because the dangers of labor have been reduced to such a low figure that we hardly think of it as being a fatal danger. Labor pains will probably be discussed quite freely here so I will just touch on them. I will suggest the possibility of resentfulness either to the husband or to the baby itself or resentfulness to themselves because of carelessness at the time when contraception might have been more carefully practiced. It is, of course, more obvious, as we have always noted, in primipara than in multipara patients.

One of the common observations we note in labor is screaming. Those of you who are nurses and have been present in labor rooms know all about the screaming patients who think they are being picked upon and hated by the nurses because the nurses do not come running every time they scream. Those people are really scared. They are more scared than they are hurt, and they are screaming because they want help. They think the nurses are neglecting them and they get a paranoid idea that you want them to suffer more than the average. That is where the role of the obstetrician and psychiatrist is very important, in preparing the patient during the pregnancy. When these patients do scream out they sometimes just scream. Very often they call for someone. The one they most commonly call for is their mother. You very rarely hear a woman calling for her husband and almost never for her father or other people.

An observation that seems a little strange is that you hardly ever hear women praying in labor. I should think, although I have no statistics on this of course, that praying is much more uncommon than the attendance in church. It is not in proportion with their praying in church. One would think in the crisis they think they are in they would pray more. Somebody—this is a quotation from someone else and I do not know who it is—told me that it is more common for the Negroes to pray and for the Italians to swear and for the Jewish patients to call for their mother.

I think the mother offers probably the greatest comfort to the patient in labor because she has gone through the same thing herself and can comfort the patient from her own experience. If the husband is present during labor he only adds to the worry. We have all seen how the patient's uneasiness is increased and how she will dramatically play up her pains when the husband is present; and when the mother is there the mother very often shushes the patient.

There is another problem when there is a prolonged labor. Most patients think labor will be a short process, even a matter of a few hours; but very few patients know that in primipara the average normal delivery requires approximately 18 to 20 hours. That means that for every rapid labor there has to be, somewhere along the line, a long drawn-out labor and that it is still within the range of normal.

I will next take up some observations during the immediate post partum period or during the first day. The first thought of the delivered patient, as most of us have observed, is the sex of the baby. They want to know whether it is boy or girl, and they will show disappointment if the sex is not one that they chose. Probably the second thought the mother has is how heavy the baby is—a question we can never answer because we have not had a chance to get the baby weighed. The next thought is concerning the baby itself, deformities or markings. It seems that a patient right after delivery thinks back through her pregnancy of all the unhappy experiences she may have had, and wonders if they have influenced the markings of her baby. She thinks next of the baby's immediate health. If the baby is perfectly fine but is not crying in the crib she worries because it does not cry. A week later she will worry because it does cry. I have not observed that mothers worry much about the baby dying and I do not think they do so immediately. If there is any worrying about the infant dying she worries about that somewhat later.

Now I come to an observation which I have called the parturition lassitude but I do not think that is quite the best term. There is a sort of absence of deep emotion; the patient is comparatively unemotional about her husband. She has not learned to love the baby yet. I do not believe in love at first sight for a new-born baby. I mean the maternal instinct has not yet developed. In regard to the question of resentment I would like to suggest that the resentment the patient has probably does not come so much from the pain and burden of labor as from the fact that she has had to carry the biggest part of the load, the uneven distribution with her husband. After the baby is born the dependence on the mother, which she has demonstrated by calling for "Mother" while she is in labor, seems to disappear considerably.

The next day of the lying-in period, after she has had a good night's sleep, the patient is much better. She wants to know all about the baby. She is inter-

ested in his activities. She has examined the baby when first brought to her. She can tell you what the baby weighs. She has observed his hair and his fingers and toes, has found the birth marks and has found out whom the baby looks like. The disappointment about its being a boy or girl begins to disappear and she is beginning to adjust her life to its sex. The responsibility of caring for the baby is lodged in the nursery, which gives her a chance to rest. We heard some arguments this morning[1] which make us wonder whether the mother really does worry less because we take care of the baby, but I think there is a good deal of relief because of the baby being in the nursery.

On the third day the breast feeding begins and the patient experiences a new pain, the congestion of the breasts and the nipples, and she has a new burden. Now she realizes, after all, she has a big job ahead and that it the job of nursing. Of course, here there is a parting of the ways. Some patients go right ahead as they had planned nursing their babies and other patients take the other fork in the road and decide they are not going to nurse the baby, or at least they let us know of their decision.

Strangely enough, after the second or third day, or even after the first day, the beginning of the second day, let us say, the importance of the husband returns. He has been sort of in the background and now he comes back and begins to take over the burden of caring for the child.

Dr. Liss asked Dr. Bacon whether he had mentioned that the first anxiety of the average mother is whether the child is normal or abnormal?

Dr. Bacon said that this is the second thought or maybe even the third. The first one is the sex.

Dr. Liss next introduced Dr. Gerard of Chicago, saying: "To my mind Dr. Gerard has had more experience with young children and their problems than most of us have had, and I am sure she will elaborate on the repercussions, the sequelae, if you will, of the mother's experience in pregnancy and child-birth upon the child.

Dr. Gerard: I have listened to four men talk about women's feelings and I am sorry I could not have heard the fifth. Then I could have had the last word.

As you noticed, Dr. Liss said I knew a lot about children, not about women, so I think I should keep to my subject. But I shall get back to the women.

One of the points that I was interested in bringing up for your own reactions was the findings I have acquired on a group of children who seem to show similar behavior patterns. The histories of their mothers are very similar in terms of their reactions in pregnancy as well as their reactions during nursing and early training.

These various reactions which one sees in the histories during their pregnancy periods grow, I think, out of certain character patterns of the mothers, certain types of feelings, we might say, which they have in approaching the pregnancy. Therefore, it is really the mother's personality which determines these reactions during pregnancy and after. If one is able to diagnose these reactions in terms of the effect upon the child, then we may be able to start some preventive psychiatric pediatrics, while the baby is in the womb, which might avoid many developmental difficulties for that child.

These children of whom I wish to speak are unusually self-centered and uncontrollable in relation to routine. They are children who often have had or, at the time one sees them have, a feeding problem. These youngsters also frequently develop some kind of learning disabilities with deep feelings of inferiority whether they are inferior or not.

We see similar patterns in quite a few children but certain mothers tend to bring out those patterns. In the group of mothers whose histories I have investigated, certain patterns in reaction to pregnancy were found. These mothers had definitely planned for children after waiting quite a while before making up their minds to have any children and finally deciding it on the basis of a rather self-centered kind of reaction. Their attitude was—"I, to complete my life, should have a child."

The pregnancies of these women have been rather stormy. They all experienced morning sickness. Several of them complained of nausea throughout the pregnancy period, and two whom I knew complained of nausea all the time. It was not just morning sickness; they would wake up in the middle of the night ill; they could not go around in the daytime without feeling ill. They were not individuals who vomited; they never became undernourished, and none developed toxemias. But the pregnancies were extremely uncomfortable. They reacted with injury to their pride which Dr. Seeley mentioned as common to some women. They did not like their figures, nor the skin changes. When the time came for nursing, these mothers were usually insistent upon nursing, but they were bad nursers. They did not like the feeling—complained of sore nipples. At the first excuse they very easily turned to artificial feeding.

During the period of discipline and training they were rigid and perfectionistic. Their whole attitude during the post partum period was pretty much, "I must do the right thing by this child." Therefore, they kept to the routine which was offered to them and

[1] Psychosom. Med., 7:169, 1945.

kept to it quite rigidly. Some were rather affectionate, others not, but it was not the ebullient kind of affectionate relationship to the child which one sees in less self-centered mothers. Dr. Bacon says there is no love at first sight. That is perfectly true, but often there is love at second sight. The warm mother gets used to this funny-looking thing even though she had visualized something quite beautiful during pregnancy. At second sight they begin to think, "What a darling I have."

But these mothers of whom I have been speaking are never satisfied with their children. An interesting thing is that they are disappointed at first and they continually act as if they were disappointed. They say the child is not controlled enough, or not bright enough. They always wish for something a little better. The child is thus exposed to a mother who had the child because she wanted something for herself, for selfish reasons, and reacted as if it were part of herself. She educates the child as if she were educating her own intellect and pushing herself to take examinations. She tries to push the child to learn early and with a perfectionistic goal, never letting him be satisfied with any achievement.

These mothers react very well to the routine training which the obstetrician and pediatricians sometimes offer but they over-do the regulations. If one extra ounce of milk is suggested, whether the child spits it up or not, they keep forcing that extra ounce down. In the routine of training the child for the control of excretory process they do it rigidly and punitively.

As an antidote to this rigidity, Dr. Aldrich has written his book, "Babies are Human Beings." The self-centered mothers really never think of their children as human beings as much as extensions of themselves. Therefore, "Babies are Human Beings" should be helpful to them because it lets them feel that they can be human beings with their babies and still be doing the right thing, whereas something routinized, like John Watson's teachings, play into the wish to push the child.

My hope is that, if the mother is recognized by the obstretrician in the beginning of her pregnancy as a driving self-centered person, he may possibly give her some insight into her problems and offer the proper kind of flexible rules for training so that the child does not become as injured by the self-centeredness and routinization of the parent. How much one can change during that period is difficult to say. On the other hand, I have found that I could help such mothers in the training of their second and third and fourth child knowing what they are apt to do from the knowledge of the kind of people they are, and after they had already injured the first child.

The extreme of this kind of reaction I once saw in a mother who attempted suicide following a recovery from her fourth delivery. All four were normal children, two boys and two girls; so there could have been no disappointment in variety of sexes and there could have been no disappointment in terms of their capacity, and four is a goodly number of children. Yet she attempted to commit suicide because the doctor had performed a necessary hysterectomy at the time of the last delivery. She learned afterwards that she could have no more children. Recovering from her morbid reaction and discussing her conscious wish to commit suicide, she said, "But I must have more children. Each child I am going to have I think is going to be the perfect child, and none of these four have been the perfect child."

This woman was trying to extend a perfection of herself into the outside world. She would probably have gone on to the 30th and 40th in her mind, because no one of them would have been perfect. Such a terrific need for self-satisfaction is harmful to any child for the child then becomes the mother's tool for self-achievement.

Dr. Liss: We find that physiological symptoms are determined by emotional states, and the significance of the nausea of pregnancy takes on a new coloration in the light of what we have learned from Dr. Gerard. She also brings to a point the question as to whether childbirth is a fulfillment of one's ego or whether it is the fulfillment of one's egotism, and the difference between the two is the difference between having the routine pediatrician taking care of your child or the psychiatrist.

Last, but not least, Commander Spock. Commander Spock is a pediatrician who is psychiatrically oriented. His discussion for tonight will be, as it always is, something extraordinarily practical, "The Commonest Anxiety of the Mother on Taking Over the First Baby's Care."

Dr. Spock: The mother, a day or two before she is to go home and take care of the baby, with a distraught look on her face, says, "I am so scared. I am afraid I am going to do the wrong thing." Obviously this anxiety has deep as well as superficial causes. I will stick to the superficial ones, and I hope you will not misunderstand some of the rash statements that I will make to emphasize my point.

One fact that has made many modern mothers anxious is health education, in its broadest sense; newspapers and magazines, health programs on the radio, posters in schools and health stations, prenatal courses in baby care.

The more secure mothers take this kind of instruction in the spirit in which it is intended. But in the

less secure ones, it mobilizes anxiety and focuses it on the infant, even before he is born. The experts seem to be saying "Beware, mother, the rearing of your baby is a serious business, fraught with risks. Trust neither the infant nor yourself. Only the scientists know the answers."

Every time a new subdivision of the Vitamin-B complex is made the anxious mother has a new sinking feeling. "One more thing that I have got to be sure that I get into my child in the correct amount." The popularization of height-weight tables has created thousands of feeding problems by encouraging worried mothers to attempt to change their children's body build by main force.

Another factor that makes many mothers anxious when they begin the care of their first baby is their complete inexperience and unfamiliarity with child care. They have not had the chances to take care of younger sisters and brothers that occurred in the larger families of the older days. And they haven't had chances to practise on the neighbors' children either. In an apartment house you can easily live for two years in the same entry with a dozen other families and only have seen the faces of a third of them.

In the South Sea islands where families live in grass huts, in a compound, there are always babies and older children swarming around, and the older children are keeping an eye on the baby. If there is no young baby in your own family you are taking care of somebody else's baby. This is the right way to learn baby care—to grow up to it.

One of the ways that has got to be used to familiarize young women and young men with small children is by having experience in their own high school and college years. A few women's colleges at the present time have nursery schools but the faculty tend to look with a bilious eye on the encroachment of child-care into the cloistered halls and are apt to throw all the academic hurdles they can in the way of students who want to take that course. Obviously, I would turn it around and say that that should be the easiest course to get into. In men's colleges too there ought to be nursery schools. I suppose the sensible way to resolve this is to say there should be no separate men's and women's colleges anyway. The initial resistance would be terrific, but once you got over the hump I think the men would find it just as fascinating as the women do.

The purpose of child-care courses and nursery schools attached to universities is not just so that young men and women can look at babies, see how cute they are, how often to take them to the toilet, and that sort of thing. It is the most direct way I know of finding out about human nature and psychology, your own as well as other people's. It is a lot easier than studying rats in mazes, and more fascinating than the kind of psychology where you spend six months drawing diagrams of a neuron with arrows showing in which direction the nerve impulse goes.

I would like to talk about the mother in the hospital. Obviously it does not help a mother to get used to her baby to have the baby immediately removed from her as soon as he is born. It does not develop her own self-confidence to have the nurses continue for a long time to take full care of the baby. I hope that we can eventually find a practical way to let the mother keep the baby near her, and to participate increasingly in his care right from the beginning.

This brings up the question of the father. In discussions of child care and child psychology, we constantly repeat that ways should be found to keep the father closer to his children in a civilization where he is away all day, and comes home in the evening tired, yearning to sit down and read the paper. I do not know how we are going to solve the whole problem, but we do everything we can, unintentionally, to start the father out on the wrong course. He has no useful function to serve during the hospital period. There is a little dingy room for him to sit in. I know of a hospital where they let him look at a whole book-full of jokes about fathers during the new-born period. Maybe it is a healthy discharge for him to be able to laugh hollowly at himself, but it doesn't build him up. He is allowed to see his baby only through a plate glass window, and then only if the nurse has done everything else she can think of that she considers really useful.

In the fancier hospitals, if the father is in the mother's room when the baby is brought in, he is immediately shooed out. It is not only that he has no useful function, he is considered as just a menace to the baby. There are perfectly good reasons from a bacteriological point of view why the hospital takes these precautions. But now we must begin to balance other points of view with the bacteriological.

The crucial time for the baby's doctor to set the mother straight, as far as possible, is before the hospital period, but it is a time of relative calm compared to when she gets the baby home. She has an impression, often illusory, that she is feeling fine and strong and could do anything now, which is only too likely to disappear when she gets home.

I believe that, for the benefit of the worrying mother, the doctor should play down the solemnity of the formula. Too often she gets the impression that it is the inflexible law of the land, the slightest infrac-

tion of which, either in preparation or feeding, will bring disastrous consequences.

The formula slip only mentions the quantities, the precautions the mother must take, and says, "Give 4½ ounces at 6, 10, 2, 6, 10, 2." There is no mention of the fact that it is a human being who is to drink the formula, that he might wake early, that he has pretty definite ideas of how much he wants at each feeding. The formula and the schedule should be presented as parts of a flexible natural program of adjusting to the baby's needs, capacity and digestive rhythm. A new mother needs to be reassured that her child, through the unfolding of his own inherent, human, developmental pattern will gravitate toward healthy, socially acceptable habits of eating, sleeping, eliminating, and getting along considerately with people; that she doesn't have to, but in fact will do better not to, institute any grim "training" program, either in the beginning or later on.

Dr. Liss: There is one element which comes out of this discussion which I think cannot be emphasized too much. It has been my experience that among my patients the one relationship which carries over and is meaningful as long as these people live is the experience with their obstetrician. That always, for these people, is deep, lasting; and something which only the old family physician had who delivered the children that he used to raise.

Now, this brings me to a point which I think is the essence of this evening's discussion, that the obstetrician has an extraordinarily rare opportunity to build up a human relationship with his patient which is the possibility of very few of us, other than the psychiatrist who often works with the patient day in and day out.

We have discussed a great deal what the obstetrician is doing and I want to emphasize again that the obstetrician is often unaware of his tremendous importance to these young mothers beyond, I think, any other specialty that I know of. That is the reason for our getting together because we think if they give these patients a good start many of us would have much less to do.

The talks are now open for discussion.

Dr. Herbert Miller: I would like to ask the obstetricians whether anything has been lost from the psychological side by giving up home deliveries?

Dr. Pratt: I presume different obstetricians will feel somewhat differently about that, but I believe not. I am sure Dr. Seeley and Dr. Bacon will agree with me that we fully realize the position that the obstetrician occupies with the mother, that we have an opportunity to do something for her. In trying to get a text to work on, to help guide us in this care of the mother, outside of the scientific problems, I have tried constantly to hold in mind what I mentioned earlier in the evening, that we consider pregnancy a physiological event and try to bend all our efforts to convince the mother that she is not going through any disease, that she is going through a normal physiological event. If she emphasizes it and says it is something unusual, it is a big event, we can go on and explain further that there are really four big events in life. There are birth, marriage, first child, and death. We know nothing of death, you know nothing of your birth, so that leaves you with two big events, and if you are not emotionally stirred at the time of these two big events there is something wrong with you.

So, of course, it is all right to be stirred emotionally, that is being physiological and that helps solve the problem for many of us.

Whether they are in a hospital or whether they are at home, if you try to keep this main text before them, that it is a physiological event, I believe that we can give them the same point of view towards their pregnancy that they could have in their home and their home surroundings.

Not only that, but so much has been said about what to do with the father, and it is really very much simpler to do with the father in the hospital than it is at home. That sometimes spoils a great deal of the obstetrician's fun if you have to deal with the father at home.

Dr. John Montgomery: I would like to ask Dr. Gerard to comment on that last question.

Dr. Gerard: I am always glad to comment but I would only have hunches because I do not know much about home deliveries, so it would be difficult from experience to compare the two reactions on the mother. I should think that if it is a matter of balance one should say that one probably adds to the feeling of security which a mother privately has if she is in the hospital because the insecurity within the home is greater. There are more people around, thinking of homes in which there are a host of servants, and then there may be other children around, impinging on the mother in the home. My feeling of relative balance would be that the hospital would probably make up for any of the familiarity security which one might get in the home. Certainly it is true that the obstetrician cannot do away with the father as well in the home. It is quite possible that the father can be taken care of a little more humanely, as Dr. Spock suggests, if he is allowed in the room a little longer.

Dr. Bacon: While I generally agree with other obstetricians that it is very much more practical to have deliveries in the hospital, perhaps the question was meant to stimulate something on this order;

Your patient, especially having the first baby, has in the hospital no one whom she knows in whom she can place confidence except her obstetrician. But he is not there. He is only there for the last minute. It is working up to the climax, and all of a sudden there is a delivery and then it is all over. The obstetrician is the fellow who officiates at the high point. The patient has unknown nurses and internes and no one who has any particular reason for feeling any sentiment about the delivery. She has a lack of security for that reason.

At home she has her mother or somebody else who is very close to her.

Another thing that probably was thought of, is the husband. The husband, whom we worry so much about, can really be important in the home delivery. Perhaps he will share the fondness and love and responsibility of taking care of the child if he has a hand in the delivery. In the old-fashioned home delivery the husband was often the one who was called upon for the ether or chloroform, and he had all kinds of other errands to run if it was not that kind of delivery.

The third point I am thinking of is that having a baby is one of the high spots in a woman's life, like getting married. It is a social function. In a marriage you gradually build up to the ceremony and all of a sudden you are married and then you got the post-marriage period. There is a great deal of emotion being poured into this event. You would not think of having a wedding in a hospital operating room. Therefore the social value is completely lost in this event. Of course, I have exaggerated a little but I am trying to give you the thought that there is more to having a baby than just the mechanics of having a baby come out of the mother.

Dr. Liss: Dr. Seeley has been stirred.

Dr. Seeley: I know the obstetricians in Detroit spend many hours with their patients in labor and they are not just there for the high spot. In fact, today I spent considerably more than ten hours already in the last twenty-four with patients in labor. So I would say that as far as the question of home and hospital deliveries are concerned now-a-days, that a patient is very likely to have her obstetrician spend a great deal more time with her in the hospital than he possibly could do with three or four cases in labor scattered over a city the size of Detroit.

Now as to the birth room. Our birth rooms are a nice, pale, quiet green, and the patient actually gets quite a lot of comfort going out of her lying-in room into a nice, clean delivery room where she can look around and see things—if she even sees them. Now-a-days, with our analgesics and forms of pain relief, it is not uncommon for the patient to wake up and never even remember she has had her baby.

So a conscientious obstetrician finds that he can spend plenty of time with his patients. That a woman is grateful to her obstetrician of course is true. Obstetricians of experience all know this.

Dr. Liss: I think Dr. Seeley has put his finger on something. These people know when you give them something, and even when they are under an anaesthetic if you give them of yourself and if you give them of yourself generously you are a good obstetrician. To my mind I think that is the crux of our discussion. How much time do you spend with your patient during this period? That is important.

I was asked by Dr. Pratt a very difficult question. I am going to turn it over to Dr. Gerard. That question is this: What are we doing for our patients when we minimize their pain during labor?

Dr. Gerard: I can understand why Dr. Liss does not want to answer the question.

Dr. Liss: I am not a woman.

Dr. Gerard: Off-hand, I would say we do as many things as an obstetrician does but it depends on how the individual takes it. Certain susceptible, hysterical types of individuals would think that you were right, perhaps, and say, "Well, it is quite right, it didn't hurt so much." I should think that perhaps in certain other rather stubborn individuals, selfish, usually correct in their attitudes, they would resent such minimization so that they might heap upon themselves more pain and show it. In other words, you see individuals reacting individually.

I did not realize that obstetricians did minimize pain. I know during my own delivery nobody ever said anything to me about it. They looked bored. Maybe that was their way of minimizing pain.

But I should say that that is a very individual reaction, and perhaps the reaction one would get would indicate whether one should go on or start with a different tack as far as the idea is concerned. That would be my first reaction. I do not think you have any particular effect upon the total delivery. I should not think so, although I think certain experiences probably do have psychological effect so that they may be partly delayed or more precipitate as a reaction from a patient's emotions. But I do not know about them. I would be interested to know why Dr. Pratt had asked the particular question.

Dr. Montgomery: I would like to ask Dr. Gerard a question. Dr. Gerard delineated the type of mother with which we are all familiar and I was not quite clear when you said that you have found that you could help them with subsequent children whether you felt that their hostility, if that is what you meant,

which they had towards their children, could be relieved rather easily or whether, as we are sometimes led to believe by psychiatrists, that it would require a prolonged course of treatment to produce results? Do I make myself clear?

Dr. Gerard: Yes, I have done various things with this particular type of individual. One is prolonged therapy, in other words, reorganization of character, so you have a less self-centered, less selfish character, a person who could give more love to her child and could be more flexible. But some of them are quite inaccessible to any kind of treatment. I have been able to change attitudes partly by changing the program; that is, these women tend to fall very easily into rigid programs. They tend very easily to push the child. Therefore, using their own tendencies and playing with them, rather than trying to correct their characters, I have given them help so that they themselves feel that too rigid a routine with too much pushing, is going to do harm to the child and therefore their own selfish interests are not going to be obtained that way.

I can remember one mother who brought a child to me with a reading problem, a child with a very high I.Q. He was not learning to read in school. This was a child who had a tremendous amount of fear of failure as a result of the mother's pushing him from birth in every point of learning. With this mother I was able to get her to forget about the reading problem and to keep her fingers out of the pie and let the teachers worry about the reading problem. I helped her realize the more she pushed the child the less the child learned. In other words I chose her own goal to change her behavior so there was a certain amount of manipulation in relation to her behavior.

In another instance there was no way one could handle the situation other than relieving the mother of the care of the child. I have recommended more care by the nurse with some help in the selection of the nurse, so that the child was handled by a nurse who could give more affection to the child. Nursery schools can also be used. In other words, if one knows at the very beginning one can perhaps prevent the mother from doing harm. You may have to bring somebody else in to do the good if the mother is not able to change her own reactions.

Dr. Montgomery: My experience has been quite similar, but I have had more luck with the first child than I have had when I have come into the picture with the second or third or fourth child. In the meanwhile the mother has become indoctrinated with this theory of rigidity with the first child and she finds it very difficult to change it. Have you encountered that?

Dr. Gerard: That is exactly what one does encounter. I get them at a different stage. They come to me because the first child has gone wrong, one might say. In other words, they are beginning to question to a certain extent why the problems in this first child? So I am able to point out to a certain extent, so that their pride is not injured too much, why she was doing this and that and the other thing, and that doctors now know some of the reasons. That is, I always blame us scientists with such a woman. We are responsible for this but now we know that a more flexible program is better for the second child. Again by playing into their own rather self-centered attitudes, I am often able to get them to change so that at least they do not do so much injury to the child.

Of course, many mothers, who are scared, just as Dr. Spock said, tend to get into these rigid routines because they are afraid not to. I think the doctors are responsible for the kind of feeding they put out, and it is enough to make any mother, whether she is one of these perfectionists or not, apprehensive that she may fail. Therefore, she can fall into the routine more easily. But the kind of mother I have discussed just laps it up, and, as you say, it is hard for her to get out of it.

Question: If this mother should shift her obstetrician would it not be easier on the second child? Maybe she would be more flexible if she had another one. Maybe the obstetrician could relieve her.

Dr. Gerard: On the other hand, I do not think that it is the obstetrician's fault that she tends to lap up his routines, although I think it is true that there are too many rules without enough pointing out of the flexibilities.

Dr. Liss: Let us not forget that a human being may take the obstetrician and the pediatrician too literally. There is something in all human beings that inclines them to take things literally. So let us be easy on the obstetrician and pediatrician.

I want to come back to a point which has not, I think, been quite answered, and that is the question of pain. I think the question of pain is important because of the planning of subsequent pregnancies. Where the pain in the first pregnancy has been severe, a border-line neurotic mother will use that as a rationalization for a limited family.

Dr. Sibylle Escalona: The psychological state of the mother in labor resembles that of a young child in distress, and she therefore requires comfort much as you would give comfort to a young child in distress. It strikes one that she is acting as a child would; she is saying the things a child would expressly say and do. We know very well under severe pain people do feel temporarily as children; and when the patient is crying out, she is calling for her mother to comfort her as a

child calls for the mother for comfort, because the mother has gone through the same kind of thing before.

If that is true, it means from a purely psychological point of view that what we are going to do for that person is what we would do for other disturbed people or what we do for children in distress—comfort them and give them as much reassurance as we can. I think that is one of the functions, among others, that the obstetrician and the pediatrician both are fulfilling.

Secondly, because of this super-strong dependence need the mother has at that time, you have a better chance of influencing her attitudes then than later when she has settled down again. I think it is very characteristic for a mother, at least it has been in my experience, to have some accepted means of dependence on someone else, some child-like attitude, throughout the period between very early before the delivery and, say, the first two or three months after delivery. Keeping that in mind, I think it is possible to do a great deal more to help the mother at that time than possibly at a later time. Later it may take years to get at the mother, to get her to see the things and to accept the attitude we want her to have. The time to do it is when she is very vulnerable and in a period when she can take it very easily.

I agree with Commander Spock that all this propaganda about the physical health arouses anxiety in the mother, but it seems to me these new points of view expressed here about the need for being flexible and doing as the baby elects to do in regard to feeding will also arouse anxiety in the mother; and we need to think of ways to present these things to her so as not to make it too threatening to her self-confidence. I think it is better to do that now than come in conflict with it at a later time.

Dr. Liss: Of course that brings up the whole question of teaching mental hygiene. Unfortunately, it is often in the hands of people who are not aware of what they are handling and they often stir up anxieties which are best left in abeyance. That is a field of research which I think we still have before us.

Question: I would like to ask Dr. Gerard a question on this pain phenomenon. The type of patient you describe we all see fairly frequently. We call them emotionally rejecting mothers, products of a cultural pattern which is based upon a conflict, a competition between men and women in all kinds of life aims. These women very frequently will have a distinct guilty feeling for having rejected a child before it is born. After all, it is distorting their bodies; it is restricting their social activities and their contacts, and so they resent it before it is born. To those people labor pains may be an expiation for a conscience reaction.

If one is dealing with that kind of individual, might the minimizing of labor pains, or even the failure to make the most of them, be a harmful factor in the future adjustment of the child?

This conscience business often shows up after birth in over-solicitousness about these children while the rejection shows up in an over-stimulation, that is, setting a high goal for the child.

Dr. Gerard: I think you are describing a little different patient than the one I described, because mine does not reject. In the type of person you describe, who rejects the child in utero, you have an individual with much deeper conflicts in relation to the child which may be tied up with some very, very strong hatred of babies and children perhaps growing out of attitudes toward siblings and experiences with siblings. So in that situation the hostility is not hostility which might grow out of, "This child isn't a good ornament to myself," but, "this child is in my way and represents a sibling to me as my own siblings did." Then I think conceivably you can assume perhaps the labor was an expiation.

In working with adults I have never found that the desire to expiate through suffering provided a solution of the problem. If so, I should say probably it would be only a temporary one, so that whether or not you help the woman in labor through her pains would not matter in the long run so far as the child is concerned, because the person with guilt in relation to hostility, as you know, does not solve it by one bite of punishment; he gets punished all the time. In other words, the inner hostility is something which is never expiated except temporarily. Therefore, such a mother one might conceive would like a child better for the first ten days because she went through labor, but then it probably would be a "little brat" by the time she got it home, and she would have to have another form of expiation. So I would, in turn, solve it in another way than making her suffer if you can stop her suffering.

Question: Have the obstetricians had experiences with mothers who do not want an anesthetic? I had that experience with a mother this morning, who wanted the baby in her room. Her first comment after coming out of the delivery room was, "I didn't want to go to sleep, but was I good?" I know several mothers who have not wanted an anesthetic.

Dr. Seeley: That is not an uncommon experience. We find quite frequently, that some patients do not wish to have an anesthetic. Particularly we find this in women who have had previous children and have had anesthesia or analgesia or some form of pain relief that left them more or less unconscious of what was going on around them. They wanted to experience their babies.

We have also had the experience of having them tell us that they did not want relief from pain, but when the pain started they often changed their minds. So I never force an anesthetic on a woman who does not want one unless it is for some form of operative delivery or care that I know is beyond the endurance of any patient, either pregnant or otherwise.

If she wants her baby without anesthesia I am perfectly willing she should have it that way, and I am not so sure that in the long range it may not be better, particularly for the baby, to have them that way. The only difficulty is now-a-days the different forms of analgesia have gotten to the point where they are comparatively safe both for the mother and for the child. If they were not, then of course we could not use them.

Dr. Liss: Any other questions? If not, I would like to close the evening with what I would consider the wisest remark made this evening and that was by Dr. Pratt, when he said that here was an event, one of the four greatest events in life which two people, patient and physician, could share together and make the way much easier because of that sharing.

We thank you for coming and we thank the consultants for their contributions. We hope at some time in the future we may continue where we have left off.

EIGHTH SERVICE COMMAND POSTGRADUATE MEDICAL EDUCATION

Neuropsychiatric Case Report

CASE NO. 7—FEBRUARY 1944

Chief Complaint. "Headaches—all my life."

Present Illness. This soldier had suffered from headaches intermittently most of his life. The headaches were preceded by an aura, at which time he experienced dizziness and inability to focus the eyes. Following the aura a numb feeling appeared in the left or right arm. If the soldier had pain in the left side of the cranium, numb feeling was present in the right arm and right side of the face. The headaches (hemicrania) occurred without definite rhythm. There was difficulty in pronouncing words when the headache was confined to the left cranium. The patient was righthanded. Nausea and vomiting followed the numb feeling in the extremity. The patient often had cold and hot flashes and thumping behind the eyeballs. Weakness and fatigue followed the headaches, which might last from several hours to one or two days. Bed rest seemed to be the most efficacious treatment for the headaches.

The soldier had taken several different medications, but with little relief. He had never taken ergotamine tartrate.

Personal History. This 30-year-old soldier was a college graduate with a Bachelor of Science Degree. He taught school for several years and had completed one-third of his work toward a Master's Degree. For a short time prior to induction he had worked as a machinist. Family history revealed that the mother of the soldier and the maternal grandfather suffered from similar headaches. There was no history of epilepsy or mental disorder. There was no history of head injury, allergy, or hay fever. The patient had adjusted well to his environment and enjoyed good health, except for intermittent headaches. His marriage was successful. The economic situation was satisfactory. He was anxious to be an effective soldier.

Physical Examination. All systems, including heart and lungs, were negative.

Neurological Examination. Cranial nerves were intact. There were some myelinated fibers on both discs at 5:00 o'clock. Reflexes: Sensation and motility normal at time of examination.

Laboratory Examination. X-Rays of the skull were negative.

Diagnosis. Migraine.

Progress. The soldier was given some insight into his condition. During the interview it was evident that he had studied a great deal about his own condition. Ergotamine tartrate was prescribed. Because of the disabling feature of his condition and the aggravation by excessive exercise and mental strain, he was seen before the Medical Disposition Board and returned to duty with a recommendation for reassignment in accordance with Circular 293.

The soldier was requested to return to the clinic in one month. On the second out-patient clinic visit the soldier stated that his headaches were not so severe. He had taken the medication prescribed. Lighter duty and drug therapy improved his condition. He was returned to duty with instructions to visit the clinic if his condition became more severe.

COMMENT

Colonel Franklin G. Ebaugh, M.C.: Dr. Lawrence S. Kubie, of Columbia University, has prepared an excellent discussion of migraine which I feel is an ideal summary.

We should not overlook the obvious fact that this soldier should not have been inducted. His educational background and drive to be an "effective soldier," the appropriate medication, and psychotherapy made it possible for him to continue in the service following reassignment, in accordance with Circular 293.

DISCUSSION OF CLINICAL REPORT

Lawrence S. Kubie, M.D.: *Diagnosis.* There can be no doubt of the accuracy of the diagnosis of migraine in this patient. Migraine is an illness, the manifestations of which occur in paroxysmal episodes. In these episodes, sensory phenomena usually play a major

rôle; and among the sensory phenomena hemicranial head pains and visual difficulties are most frequent. It must always be borne in mind, however, that in migraine widely distributed paraesthesia can occur with or without head pain, and that there may also be localized or generalized motor disturbances, in the form of transient palsies, transitory spasms, convulsive episodes or cerebellar disturbances. Cases are on record in which epilepsy and sensory migraine have succeeded each other or alternated in the same patient. There can be no doubt that in such cases a single pathological process underlies both manifestations. It is of interest that migraine appears in the family histories of many epileptics, but that epilepsy is not disproportionately frequent in the family histories of sufferers from migraine.

The characteristic feature of both sensory and motor phenomena is the fact that their topographical distribution conforms to the cerebral representation of the body. For instance, in a right-handed person pain on the left side of the head may be associated with transitory aphasic difficulties; or pain on the left side with right-sided numbness or palsy or hemianopsia. It is this type of distribution which makes inescapable the conclusion that the site of the pathological process must be at least partly in cerebral tissue.

Another characteristic of the migraine attack is its tendency to build up from premonitory sensory warnings. Usually these occur first in distance receptors, especially the eyes, with characteristic localized disturbances in the field of vision, such as dim spots, circling lights, scintillating colored wheels, partial field obliteration, etc. More rarely there may be premonitory warning disturbances involving hearing, taste, or smell. These warnings are followed frequently by paraesthesia such as sensations of numbness in the tongue, face, arms, hands, legs, etc. Then the pain comes on, usually with a hemicranial distribution (whence the name). This builds up in a crescendo of severity, with a final vegetative explosion in which severe vasomotor changes may occur such as nausea, vomiting, diarrhea, and bladder disturbances. With the vegetative discharge, the pain and the other centrally produced phenomena usually disappear, leaving the patient weak and fatigued, but otherwise free from residues. The precise mechanism underlying this sequence is not clear; but the recovery after vomiting, which is so characteristic of migraine, is reminiscent of the therapeutic effect of induced emesis in the treatment of paroxysmal tachycardia.

Rarely, after a patient has suffered repeated attacks, in each of which the symptoms have been constant, he may be left with a permanent defect such as a permanent ptosis, ophthalmoplegia, or a persisting hemianopsia.

The history of migraine goes back to early Greek medicine; and with shifting fashions, there has been much variation in what is included in the clinical concept of the disease. In an individual who has migraine himself or a family history of migraine any paroxysmal episode is likely to be called "a migraine equivalent." This is especially true if he shows any anomalies in his electroencephalogram, in spite of the fact that many cases of true migraine have normal electroencephalograms. It is not clearly justifiable, however, to include in the conception of migraine such diffuse functions as are described by Slight and Morrison (*American Journal of Psychiatry,* November 1940, Volume 97, pages 623-632). They describe as migraine equivalents, which may either replace or alternate with classical attacks, such things as vasomotor episodes, acute emotional states, pain other than head pain, abdominal and cardiac crises, neurodermal phenomena, vertigo, convulsions, asthma, and sudden flurries of obsessional and phobic ideas. If all of these are truly migrainous in origin, then any search for a common underlying pathology would seem futile.

Pathology. The pathology of migraine is not fully known, although recent work on the pathology of headache in general is laying the basis for a clarification of the problem. (Cf. Penfield and McNaughton, *Archives of Neurology and Psychiatry,* July 1940, Volume 44, pages 43-75; and Kunkle, Ray, and Wolff, *Bulletin of the New York Academy of Medicine,* June 1942, Volume 18 pages 400-422.)

From the work of these and other authors about six alternative or mutually supplementary basic mechanisms of headache are recognizable. Among these, the one which seems to offer the most likely explanation of paroxysms of migrainous pain is a process involving disturbances in the blood flow to the head, with alterations of the relative volumes of intracranial and extracranial blood lakes, engorgement of the vascular dural sinuses, spasms in the various branches of the internal carotid artery, and especially spasms followed by dilatation of these arteries in various areas of the brain itself, in the meninges, in the bones of the skull, and in the superficial tissues of the head. Variations in the locus of these phenomena could account for variations in subjective and objective symptomatology.

Older theories include the idea of a congenital partial stenosis of the foramen of Munro, with periodic obstruction and periodic internal hydrocephalus. Stress has also been laid by certain authors on a hypothetical angioneurotic edema of the choroid plexus, with hypersecretion of the cerebrospinal fluid, and intermittent increase of intracranial pressure.

No theories involving changes of intracranial pressure have been adequately supported by objective studies of intracranial pressure during attacks. No

transient swelling of the disc has been observed. On the other hand, transitory spasms of the vessels of the retina have been recorded.

Etiology. Even if we accept as a working hypothesis the vascular theory of the pathology of migraine, a full understanding demands some explanation of these vascular changes. It is known that the condition can arise in a large number of clinical settings:

(a) Cases are on record in which it has been possible to prove that the attacks occur as a manifestation of a specific food allergy, and in which the attacks can be induced by giving some article of diet to a patient, well disguised, and can be prevented by excluding that foodstuff. Furthermore, a history of allergy can sometimes be obtained not only in the patient himself, but in several members of the immediate family.

(b) Evidence of anomalies in vascular reactions elsewhere in the body is sometimes obtainable; *e.g.*, changes in skin temperature with tobacco or with emotional stimuli, general vasomotor instability, a tendency to hypertensive episodes, and the like.

(c) Theoretical and clinical evidence for an underlying disturbance in the glands of internal secretion can sometimes be adduced. Special emphasis has been laid on the pituitary, because of its proximity to the cavernous sinus, because of the occasional periodicity of the attacks in relation to menses, because of the changes sometimes demonstrable in X-rays of the sella turcica, because of the frequency of ophthalmic signs and symptoms, and because of the therapeutic results sometimes achieved through the administration of pituitary extracts.

(d) A more direct correlation can sometimes be established with disturbances in the menstrual cycle. Thus the earliest attacks frequently occur at puberty, and there may be a spontaneous disappearance of the attacks during pregnancy, lactation, or in the menopause. Brickner and Kurzrok have reported anomalies in prolan in the urine in a high percentage of those women whose migrainous attacks occur regularly at a special period in the menstrual cycle. Furthermore, migraine occurs in women about two and one-half times as frequently as in men. Finally, the symptoms can sometimes be alleviated by glandular therapy, directed towards the correction of any anomaly in the menstrual cycle.

(e) In view of the interrelationships between glandular function, allergies, and vascular responses, it is not surprising to find that emotional factors play a clearly definable rôle in the manifestations of the illness. Indeed, so important is this rôle that an attack on psychodynamic factors is often the most effective therapeutic weapon available, in spite of the organic nature of the underlying pathological process.

DIAGNOSTIC CRITERIA AND THE RECOGNITION OF MIGRAINE AT THE INDUCTION STATION

The diagnosis of migraine rests almost exclusively on an accurate history except in those cases in whom objective motor, vasomotor, or secretory phenomena can be observed directly. The evaluation of the history is sometimes difficult by reason of the fact that patients who have suffered from life-long headaches of any nature usually will have picked up a good deal of information about migraine from physicians who have previously questioned them, from friends, and from members of their own families who have suffered from similar headaches. Therefore, the influence of suggestive leading questions and the influence of unconscious imitation cannot always be ruled out. In the evaluation of the story, as in the evaluation of a patient's description of other subjective phenomena, the accuracy with which the topographical distribution of the symptoms compares to known anatomical relations is the best indication of the validity of the data.

Electroencephalograms, X-rays of the skull and especially of the sella turcica and the glandular and allergic status should always be appraised. In all of them, positive findings assist the diagnosis; but negative findings never rule it out.

The neurological examination is always negative except in patients who show objective disturbances during an attack, or in the rare patient with a persistent and demonstrable residual defect, such as a persistent palsy or a persistent hemianopsia.

Therefore, from the point of view of the physician at the Induction Station, the most important criteria will be the history of the severity and frequency of the attacks and the extent to which they have handicapped the registrant in his civilian life. Confirmation of the registrant's story should be sought from his family physician, outside clinics, family, school, employers, and associates. Here, most significant will be the question of whether or not the registrant has been forced repeatedly to seek medical treatment for his symptoms in years before the war. When no such treatment was needed, one may be entitled to some degree of scepticism as to the reality or severity of the disorder. Where such help was often needed, the registrant should be regarded as a poor military risk; either his migraine is real and disabling, or he has an equally disabling neurosis. In either case, he should be excluded or, at most, assigned to limited service.

Treatment. For many centuries the only treatment was self-medication, which consisted largely of rest in the seclusion of a darkened room, cold bandages on the forehead, and persistent catharsis.

With the growing appreciation of the relationships between migraine and the epilepsies, persistent prophy-

lactic use of bromides and luminal was recommended. In a certain number of cases, this will prevent the attacks. Dilantin has also been recommended in doses of 0.2 to 0.6 gram per day, (Merritt, H. H., and Putnam, T. J., *Jour. A. M. A.*, Sept. 17, 1938, Vol. III, pp. 1068-1073).

Desensitization where any allergic sensitivities can be demonstrated and glandular treatments where there are any hints of glandular anomalies are obviously indicated, as are the elimination of any sources of toxic infection, such as frank apical root abscesses, sinus infections, and the like. It would be unwarranted, however, to expect relief unless the evidence of disease in one of these directions was clear, severe, and acute.

Since the report by Lenox (*Am. Jour. Med. Sciences,* April, 1938, Vol. 195, pp. 458-468), and Von Storch (*Jour. A. M. A.,* July 23, 1938, Vol. III, pp. 293-300), ergotamine tartrate has been regarded as a specific remedy for this condition. Some feel that its action is so specific that they will change the diagnosis if it is not therapeutically effective. Such reasoning, however, is of doubtful validity. However that may be, intravenous doses of 0.25 milligram, or subcutaneous doses of 0.50 milligram, either to be repeated in two or three hours if necessary, will usually terminate an attack. The same medication taken by mouth during the prodromal period will frequently abort an impending attack.

Where symptoms of ergotism develop, the use of atropine sulfate, 0.4 to 0.5. milligram sublingually or subcutaneously is recommended, as well as calcium injections for muscular pain and cramps, and reassurance and sedatives for anxiety and insomnia. The only contra-indications to the use of ergotamine are frank-sepsis, obliterative vascular diseases, coronary disease, phlebitis, severe arteriosclerosis, hepatic or renal disease, and definite Vitamin C deficiencies.

More recently, Alvarez (*Proceedings of Staff Meetings of the Mayo Clinic,* March 15, 1939, Vol. 14, pp. 173-174), and Alvarez and Mason (Same Journal, September 25, 1940, Vol. 15, pp. 616-618), have recommended the inhalation of pure oxygen through a nasal catheter in doses of 6 to 8 liters per minute for a period of one to two hours, or else for several hours as a preventative.

Engle and Evanson (*Am. Jour. Med. Sciences,* Nov. 1942, Vol. 204, pp. 697-703), recommend the use of 6 grains potassium thiocyanate daily, both to prevent attacks of migraine and to relieve them. They reason that a long-acting vasodilator may prevent the initial vascular constriction and thus forestall the subsequent pain-producing vasodilatation. They achieved therapeutic results in a majority of a small series of cases if they produced blood concentration of 2.5 to 8.0 milligrams per 100 cubic centimeters. Hines and Eaton (*Proceedings of the Staff Meetings of the Mayo Clinic,* April 22, 1942 Vol. 17, pp. 254-256) report similar good results with the same medication, but felt that the most effective blood levels are usually between 10 and 12 milligrams per 100 cubic centimeters.

Finally, no discussion of therapy would be complete without a consideration of the importance of psychotherapy. This should not be taken as indicating a belief that the disease is a purely psychogenetic disturbance, but merely that all emotionally charged problems, by reason of their inevitable influence on vegetative functions and particularly on smooth muscles, the heart, blood pressure, and peripheral and central blood distribution, must inevitably form a neurohumoral soil in which just such episodes as these can develop. Cases are now on record in which intensive psychotherapy, and particularly psychoanalysis, has either wholly eliminated migraine attacks without medication, or greatly reduced their severity and frequency, or reduced the amount of medication needed. Undoubtedly this is one of the situations in which combined attacks through appropriate medication and specific dynamic psychotherapy is the only rational approach.

CASE NO. 10—MAY 1944

A 20-year-old, Italian-American, airplane mechanic student, was referred to the Consultation Service by the Field Dispensary on June 14, 1943. Contact continued for several months, and consisted of a series of psychiatric interviews and a psychiatric social history, upon which this case report is based. Due to limitations of space, only the essential material is presented.

On the first interview, the soldier presented the general appearance of a young, healthy person of average intelligence. He approached the examiner with an attitude and manner of irritability and hostility. A tense facial expression and tendency to avert the eyes from the examiner characterized his response. His chief complaint was headaches, which he felt as a dull pain over the top of his head. Although subject to transient headaches for years, the onset of the present attack occurred about six weeks earlier while attending aerial gunnery school. The headaches had grown more intense and lasted for several days at a time. Frequently nausea, anorexia, and vomiting would accompany them. He also noted an uncomfortable, confining feeling while in the cockpit of a plane. Crowds at the Post Exchange became a considerable source of irritation and he began to avoid noisy groups. The headaches did not hinder successful termination of gunnery training. Four weeks after graduation the headaches became intolerable and he reported to sick call, at which time he was in the second week of Aircraft Mechanic School.

The soldier indicated that he had had intermittent mild headaches for years. He dated them from the time of a fall from a height of six feet, during childhood. This resulted in a minor scalp laceration and a fractured nose, which required

only local medical care. There was no unconsciousness, confusion, amnesia, or other complaints indicative of more serious effects. Neither the history nor the symptoms were indicative of an organic syndrome.

The degree of affectivity coloring the somatic complaints directed the course of the examination. It was learned that the soldier was deeply concerned with the family interpersonal relationships. This appeared to revolve about the ill health of his parents and their financial status. It was elicited that the mother suffered from long-standing hypertension and the father from a heart condition, which had had its acute onset two years earlier. This was reported with an obvious increase in feeling, reaching the proportions of anxiety and deep concern, indicating the presence of a significant emotional factor. As the soldier's disorder was considered amenable to therapy and since his efficiency for military duty was seriously threatened, he was advised to return for further psychiatric study and treatment.

On his return he remarked that the headaches had not appreciably changed and again requested that relief be given. He was told that it was necessary to understand his condition more clearly before the type of treatment could be decided on. He was then asked to relate in more detail the family difficulty to which he had earlier referred.

The soldier stated that his father had suffered an acute heart attack two years before. The father owned and operated a small garbage collection business which could only produce an adequate family income with members of the family participating as workers. The family physician informed the soldier and his mother that continued work would be sufficient to cause a relapse and might well endanger the father's life. The father's withdrawal from the business would threaten the only source of family income. It was decided that the soldier, who at the time was a sophomore in high school, should take over the father's work. He was quite agreeable to the arrangement and continued in this employment until February 1943, when he was inducted into the Army. This precipitated a crisis which could find no solution in hiring outside employees, as the manpower shortage was making itself strongly felt in his community. There appeared no recourse but the return of the father to active participation in the work within the limitations of his health. He confined himself to light, supervisory functions, and used the available unskilled labor for the strenuous lifting, dumping, etc.

The soldier again manifested intense concern as he expressed fears that his father's return to work might cause a recurrence of the heart attack and probably his death. It became evident that there was a disproportionately intense reaction to the reality of the situation. In direct association, he related that he had been a constant source of difficulty to his parents because of his behavior toward them in any family discussions. Minor family problems always evoked a loud and angry gesticulating response, which repeatedly caused his parents to plead with him for more control. He was aware that these scenes did not call for the intense response that he invariably developed. They always left him troubled and he was never able to understand clearly the reason for their occurrence and his lack of control. He now felt that his attitude towards his parents, particularly toward his father, was instrumental in intensifying their ill health.

The natural and expected filial devotion and concern alone could not explain the intensity of feelings and symptom formation. The attendant anxiety made it evident that the ambivalence that he felt towards his father was the motivating force creating the psychosomatic symptom complex. This also made clear the quality of the transference relationship with the examiner. An attempt was then made to show the soldier that his symptoms were essentially the reaction to the ambivalent feelings that he must have about his father. The soldier tacitly accepted this interpretation, while verbally demanding, "That may all be so, but I still can't see how all this can cause my headaches. Something has got to be done for my headaches." This was the typical form that he depended upon as a defense against recognition of the real importance of his conflicting feelings toward his father. The subsequent three interviews were essentially devoted to a working through of the interpretation.

The growing evidence of the soldier's acceptance of the interpretation was manifested by the shifting emphasis from the dominant concern with somatic complaints to a greater expression about the involved home situation. The cumulative effect of this made it evident that unconsciously the soldier was recognizing that the emotional content, rather than its somatic expression, was his real problem. He met this threatening awareness by offering as his solution a request for a furlough, which he immediately recognized would not serve as a permanent solution to the problem. A recommendation for furlough was not granted because this was understood as a flight from facing his real conflict. This was discussed with him, and he responded with an expression of fear that his father would meet an untimely death, "unless I do something."

His frustration at the denial of his request revealed itself in his failure to keep his appointment for the following week. Two months later he returned to the Consultation Service with the request that he be allowed to see the psychiatrist. He gave the impression of newly acquired contriteness, intermingled with a defensive hostility, as he recounted the events since his last interview. He related that following his last contact with us, the headaches became severe and were accompanied by vomiting. The intensity was such that he had to go to sick call, and the Dispensary Officer admitted him to the Medical Service. While on the medical ward, he was referred to the nose and throat surgeon because of a deviated nasal septum. The Surgeon informed him that an operation on his nose "might offer some relief from the headaches." The soldier accepted surgery and Metzenbaum resection was done. When asked whether he received any relief, he replied, "I am worse; my headaches are as bad as ever." The soldier's reaction, as manifested in these events, was understood as the expression of the ambivalence already noted. Subsequent interviews continued to follow the same course. He complained of headaches and demanded relief from them. However, his resistance to the idea that his headaches were psychogenic in origin gradually grew less. This was further supported by the regularity with which he now kept his appointments.

This did not alter the soldier's insistence that the only way that his father's health could be safeguarded would be through his return to the home to assume the father's responsibilities.

Several days later, his case was presented before the hospital Neuropsychiatric Conference. The case was chosen to demonstrate a typical "psychogenic headache" for which relief had been sought through surgery. Before the soldier was excused from the room, he was asked frankly to tell the audience what help he was receiving from the interviews at the Consultation Service. With momentary reluctance, he then gathered up his courage to take this opportunity to gratify his hostility by somewhat defiantly replying, "No, I can't see how they help me."

In a later interview, he reported that he had just received a letter from home which informed him that his younger brother, Harry, who had recently been permitted to drive an automobile, had struck and killed an elderly man. He expressed concern that the brother's driver's license might be revoked and that he might be subject to a jail sentence. The importance of this lay in the effect this would have on the business, to which the brother devoted part of his time. The soldier utilized this turn of events in support of his resistance and again pointed out that he must return home. As this new factor could only be an additional burden to an already difficult problem it was considered therapeutically expedient to obtain the facts about the accident and a complete social history. He was referred to the psychiatric social worker (American Red Cross) for this.

The history, which was obtained in about two weeks, was extensive and complete, the request for it having met with full cooperation by the family and other informants. It verified the soldier's account of the serious nature of the brother's accident and the difficult home situation.

Additional material pertinent to the soldier's personality development was furnished. It was clear that he had been reared in a family held together by strong emotional bonds. As the oldest of three boys he was the favorite of the mother, who always over-protected and defended him in family disputes. He was considered "nervous" and irritable by the family, but he made an adequate social adjustment to both boys and girls. Eating habits were notably colored by complete rejection of meats and fish and the abundant use of fruit and milk. He reacted to the threat of induction with marked insecurity and anxiety.

His next younger brother was allowed to carry a full school program, which included after-school athletic activities, etc. This opportunity was denied the patient, as it was necessary for him to assume responsibility and spend his extra time carrying on the business. This caused an active flare-up of resentment toward the brother and a strong rejection of the business. This feeling continued and the patient had made plans for seeking other employment, up to the time of the father's acute illness.

The family very clearly indicated that any temporary action, such as a furlough, would be of little value as a solution to the complete problem. The parents expressed their awareness that the patient's return home would only be of real value if he could remain there permanently. This data complemented and was consistent with the soldier's history and the psychiatric impression gained.

At the next interview, in discussing the real situation at home, the soldier reacted with heightened anxiety as he demanded consideration for his need to return home. The brother's accident was an immediate threat to the family's economic security. While the soldier's neurotic reaction was considered insufficient grounds for a furlough or discharge from the Army, it was felt that he should be given the opportunity to have a hearing for a dependency discharge. The soldier was informed that this was a command function, and that his Commanding Officer would receive the benefit of all the information that we had available. It was emphasized that the Commanding Officer and higher authorities appraised dependency discharge request in accordance with certain regulations and that he should not anticipate success unless the economic status of the home was such that it would fulfill the necessary requisites. He accepted this arrangement and the information was transmitted by telephone to his Commanding Officer. Some days later he reported that his request for a dependency discharge had not met with approval. Despite this frustration, the soldier appeared to have emotionally accepted the unalterable fact that he had to remain in the Army and could not return home.

It was evident that his ability to accept this situation was based on the rationalization that he had made every effort to fulfill his moral obligations and could now project onto the Army the responsibility for his failure to do so. In this way he appeared to have discharged, in part, the feeling of guilt growing out of his unconscious hostility toward his father, which he attempted to resolve by replacing his ill father in the business. During this period the soldier made no reference to his somatic complaints.

Approximately five weeks later he was graduated from Aircraft Mechanic School. His school record showed that during the first two-thirds of his course he "washed back" four times, whereas in the latter third he maintained average passing grades.

SUMMARY

A typical case of psychogenic headache in an otherwise healthy soldier is reported. Presenting symptoms and history contain characteristic psychic and somatic components. From the transference relationship and the material presented, the symptom-complex was recognized as due to an unresolved emotional conflict. The soldier's family history and personality development revealed this to be ambivalence toward his father, toward whom he was unconsciously driven to express hostility. This was accomplished through a compromise symptom-formation. Somatic symptoms diminished in intensity as the emotional content of the soldier's problem was made clear to him.

The soldier's growing awareness of the underlying motivation aroused resistance in the form of flight for relief on the somatic level. The acceptance of surgery exemplified the typical wishful need to find the consciously acceptable support that a somatic disease offers. It can be surmised that the soldier's rejection to the psychiatrist in seeking surgical re-

lief and then return to the psychiatrist was an acting out of the basic ambivalence he felt toward his father. The return to the psychiatrist, while in part due to the need to seek relief, was motivated by the unconscious need to discharge the guilt feelings growing out of the expressed hostility. This was again observed as the soldier's resistance took the form of an intense need to return home to relieve the ill father of the business responsibilities. In so doing, he no longer felt the the inner threat that he would be in some way responsible if the father were to die and thus his ego was strengthened in repressing the unconscious hostility. The displacement of the conflicting emotions from the somatic complaints into this resistance clearly indicates that the underlying force produces the somatic complaints as a defensive compromise. The form of resistance also was to serve the purpose of obtaining secondary gain by separation from the service. The evident neurotic motivation of the somatic symptoms and the secondary gain made it necessary to refuse consideration for either a furlough or a discharge, if therapeutic assistance were to be given the soldier.

The threat to the already critical home situation given by the brother's accident did not alter the fundamental neurotic pattern. However, it admirably lent itself for further rationalization of this defense. The reality situation, nevertheless, demanded consideration on its own merits, and in this sense the soldier was shown that his request to return home would be evaluated in terms of the real economic situation at home. When he was shown the lack of medical basis for discharge together with the disapproval of his request for a dependency discharge, there appeared to result sufficient gratifying relief for his guilt, so that he was able to project onto the Army the responsibility for his failure to relieve his father. He appeared to have thus made a readjustment wherein the conflict became more quiescent and he suffered less from somatic symptoms and anxiety. The therapeutic process made it possible for the soldier to relieve a sufficient degree of the emotional disturbances arising from his conflict to be able to make a healthier adjustment, which allowed him to function as an efficient soldier.

The soldier's problem, which on first glance would appear to be of somatic origin, was actually found to have emotional forces as its cause. Psychotherapy made it possible for the soldier to recover from his acute maladjustment and to continue to function on a constructive military level. This was found to be practical within the limitations inherent in the Army framework.

COMMENTS FROM CONTRIBUTORS RELATIVE TO THE PSYCHOSOMATIC CONCEPT

THE SIGNIFICANCE OF "THE CONCEPT OF A PSYCHOSOMATIC AFFECTION"

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When the phantoms due to linguistic misconception have been removed, the way is open to more fruitful methods of interpretation and to an art of conversation by which the communicants can enjoy something more than the customary stones and scorpions.

—C. K. OGDEN and A. I. RICHARDS in *The Meaning of Meaning.*

In an Editors' Footnote to my paper on *The Incidence of Psychosomatic Affections in Great Britain* published in the May issue of this JOURNAL objection was taken to the use of the expression "psychosomatic affection," a term under which I had subsumed such disease labels as peptic ulcer, gastritis, diabetes, the hypertensive cardiovascular disorders, exophthalmic goiter, "fibrositis," etc. The ground of the criticism was that, as the method of approach called psychosomatic medicine could be applied to the whole field of medicine, the employment of the expression *psychosomatic affection* seemed to be "arbitrary." I told the editors that I agreed with the first part of the statement but disagreed with the inference. As a result I was invited to discuss the reasons why I regarded the expression *psychosomatic affection* as a legitimate one. My present task, therefore, is to indicate the way in which this term symbolizes a scientifically constructed reference for certain designated disorders and diseases.

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(A) THE NAIVE NEED FOR A GENERAL TERM OF REFERENCE FOR THOSE DISORDERS AND DISEASES IN WHICH THE APPLICATION OF A PSYCHOLOGICAL APPROACH PROVIDES INFORMATION OF HIGH ETIOLOGICAL RELEVANCE

This simple necessity may be illustrated by my own experience which has, however, been duplicated by many others.

After graduation I became a surgical intern and in this capacity I saw many patients with bruises, wounds and fractures. Instinctively I asked most primitive questions. One was: *When* did this happen? Another was: What happened? (*i.e.*, what did the individual meet, or to what physical mass was this bruise, wound or fracture a reaction?) The answers provided data relevant to the etiology of medical events subsumed under the term of Injuries or Accidents. On becoming a resident physician in a large fever hospital I found

myself asking similar elementary questions: When did the individual fall ill? and, What did he meet? (*i.e.*, what micro-organism had he encountered and what person or "carrier" had been the vehicle of its transmission to the patient? But I added a further question, viz., What kind of person is this? (*i.e.*, what characteristic, or characteristics, rendered him unduly susceptible to the "environmental factor"?) Answers to such questions again provide fundamental etiological information. Next, I served as a member of the staff of a Public Health Department in a large city and there I came to learn still more about environmental factors which brought about the reaction called disease. Thus I learned how the Infectious Diseases, although primarily a reaction to micro-organic life, were also etiologically associated with other environmental factors such as housing, poverty, feeding habits, deficient sanitation, etc. I learned too how many common diseases of infancy were associated not only with micro-organisms or with improper feeding but also with poverty and "feckless" mothers. Even the toxic reactive diseases of industry were not merely a function of a noxious chemical substance but were related to the "sensitiveness" as well as to the carefulness or carelessness of workers. These experiences in preventive medicine enabled me to appreciate not only the complexity of etiology, but they also demonstrated the practical usefulness, as a necessary preliminary to understanding, of the division of diseases into broad causal categories based largely on the nature of the dominating external etiological factor, as, for example, Infectious Diseases, Disorders of Nutrition, Injuries, Intoxications, etc.

After several years in a Public Health Department I was appointed to act, under the National Health Insurance Act, as a medical referee, of insured persons who were sent by their insurance societies for an independent medical opinion on capacity for work. Thus, after many years of clinical experience mainly confined to the infectious diseases and the illnesses of children, I encountered again the disorders of general medicine—but I saw them with fresh eyes so to speak, my outlook on diseases having undergone a change as a result of my training in preventive medicine with its dominant emphasis on etiology. Instinctively I applied myself to find answers to the three fundamental "questions of the etiology of onset" (2) which I had so often asked when investigating a case of infectious disease: (i) Why of all the days in his life did he fall ill when he did? (*i.e.*, to what environmental factor was the illness a response?) (ii) What kind of person was he? (*i.e.*, what characteristic rendered him susceptible to the "causal" environmental factor?) (iii) Why did he fall ill in this way and not another?

This line of enquiry at first yielded little result because it took cognizance only of physical factors of environment. When, however, I began to investigate in addition the patient's emotional upsets and the external events which precipitated them, I began to obtain insight as to why many patients fell ill when they did. Viewed in this way the illness appeared often to be of the nature of a reaction of the individual to upsetting or frustrating factors, *i.e.*, to environment in its psychological aspects (*e.g.*, unemployment, domestic unsettlement, financial stringencies, loss of aim in life, and circumstances inhibiting the expression of particular creative activities). I concluded that *many of these patients would not have taken ill when they did had it not been for the social circumstances of the times* (1930-38) and that by altering social environment in its psychological aspects much incapacitating illness was preventable. Here was a new field for preventive medicine!

The group of disorders in which a psychological approach provided information of high etiological relevance covered a great variety of illness: hysteria; the anxiety states with visceral disturbances (*e.g.*, gastritis, "debility," disordered action of the heart, "rheumatism," "bronchitis," etc.); as well as disorders with definite structural changes (duodenal ulcer, coronary thrombosis, "fibrositis," asthma, etc.). To all these disorders I mentally applied the term *The Affections*, a word which has not only a medical connotation of malady or disease but also a deeper and older significance indicating the mental state, disposition, emotions, feelings, impulses, etc. (Indeed I have sometimes thought that the expression *The Affections* would be more suitable than the one which I finally adopted, namely, *The Psychosomatic Affections*.) Later as I came to realize in addition the etiological importance of the "kind of person" who "takes" these disorders I prefixed the term "psychosomatic" to the word "affection" as it emphasized that these illnesses could be regarded not only as reactions to psychological aspects of environment but also as "disorders of the personality." The insight that the organism could be viewed and considered not only by physical approaches, methods and techniques, but also by psychological ones was therefore supplemented by the insight that the environment of the individual as he grew in time could be viewed and considered not only in its physical but also in its psychological aspects. Seen in this light a "psychosomatic affection" appeared as a reaction of an individual (with his particular inherited endowment) to the flux of his total psychosocial situation—past, present and future—viz. his social conditioning in infancy and childhood, the painful upsetting or frustrating experiences of adult life, as well as his feelings and attitudes towards events yet to be.

A more adequate account of these matters is set forth in my paper, "The Principles of Etiology" (2).

(B) THE DEVELOPMENT OF THE MENTAL CONSTRUCT CALLED PSYCHOSOMATIC AFFECTION

A crude and preliminary definition of a psychosomatic affection would be:

> "a bodily disorder in which the application of the psychological approach provide information of high etiological relevance";

or alternatively:—

> "a bodily disorder whose nature can be appreciated only when emotional disturbances, *i.e* psychological happenings, are investigated in addition to physical disturbances, *i.e*. somatic happenings."

When we adopt one or the other of these tentative definitions we find that a great variety of illnesses and diseases could be assigned to this category and that these involve most of the systems of the body. On reviewing a list of these designated disorders (4) we note that superficially they seem to be unrelated but further consideration reveals that many, perhaps the majority, show peculiarities that distinguish them from illnesses in other categories such as the Infectious Diseases, Injuries, Disorders of Nutrition, etc. and in virtue of which they may be said to possess a common "form." These peculiarities relate both to the behaviour of the illness in time and to the nature of certain etiological factors and may conveniently be summarized by setting them down as a 6-point formula by means of which the construct of a psychosomatic affection becomes developed.

The Formulation of a Psychosomatic Affection

1. Emotion as a Precipitating Factor: Examination of patients in series shows that in a significantly high proportion of cases the bodily disturbance emerged, or recurred, on meeting an emotionally upsetting event.

2. Personality Type: A particular type of personality tends to be associated with each particular affection.

3. Sex Ratio: A marked disproportion in sex incidence, frequently of a "several times" order, is found in many, perhaps most of these disorders. (For the interesting phenomenon of sex-shift, see (5).) This is in marked contrast to what is found in the Infectious Diseases in which the incidence is practically even between the sexes.

4. Association with Other Psychosomatic Affections: Different affections may appear in the same individual simultaneously but the more usual phenomenon, as revealed in their natural history, is that of the alternation or the sequence of different affections. (These "associated, alternating, sequent, or displacing affections" were referred to by Flanders Dunbar in her book *Psychosomatic Diagnosis* as "combined or overlapping syndromes.")

5. Family History: A significantly high proportion of cases give a history of the same disorder or of an "associated disorder" in parents, relatives and siblings.

6. Phasic Manifestation: The course of the illness tends to be phasic with periods of crudescence, intermission and recurrence.

The various items comprising the formula were fully discussed in the paper in which it was introduced (4). All that need be emphasized here is that by adopting a tentative definition of a psychosomatic affection and then "seeing how it works" we find that—*diseases assignable to the psychosomatic category have peculiarities quite distinct from those of diseases primarily assignable to other broad etiological categories.*

(C) THE PRAGMATIC VALUE OF THE CONCEPT OF A PSYCHOSOMATIC AFFECTION

A realization that certain common designated diseases are assignable to the psychosomatic category enables the physician to appreciate as a matter of routine the need for supplementing an academic medical examination by a psychological one if adequate guidance for action (*i.e.*, treatment) is to be attained.

The chief practical value of the concept however is probably in relation to preventive rather than curative medicine in that by its means the occurrence of certain common organic and disabling diseases can be etiologically linked with environment in its psychological aspects. As an example a few illustrations of the usefulness of the Incidence Rate of psychosomatic affections may be given.

The Incidence Rate of Psychosomatic Affections as an Index

1. As an Index of Communal Frustration: The official annual report on the morbidity statistics of Scottish insured persons for 1937 provided for the first time special data relating to the "chronic sick," *i.e.*, persons on the sick list for a year or more. These statistics show that during the years 1930-35 the rate of chronic sickness in Scotland had increased by one-third. Analysis of the data showed that this increase was made up almost entirely of those disease labels which were indicative of illnesses in the psychosomatic category (1). The rising trends in the incidence of these affections was a striking social phenomenon which was clearly related to the increasing social frustration during the early 1930s following the financial crisis, when unemployment was at a high level;

when, because of the existing scales of relief, it was almost as profitable not to work as to work; and when the way of life among all classes was becoming increasingly dark and uncertain.

2. As an Index of Group or Occupational Morale: In a study of the incapacitating disorders in underground coal miners in Scotland (3) in which it was shown that the incidence of psychosomatic affections (including hysterical manifestations) was definitely higher among underground coal miners than among males belonging to other occupations, I suggested that these incidence rates might be regarded as an index of group morale. (This statement is really oversimplified and the interested reader is advised to consult the original paper.)

3. As an Index of Changes in "Personality Type": My survey of "The Incidence of the Psychosomatic Affections in Great Britain"—the one that occasioned the Editors' Footnote which acted as stimulus to this article—showed, among many other interesting things, that certain diseases which had predominated in males during the nineteenth century became during the twentieth century relatively more frequent in females; and conversely that certain diseases which had predominated in females became relatively more frequent in males. I suggested that this finding was remarkable in that it seemed to provide a measurable index of the changes in psychological characteristics or "personality type" of male and female that had been progressively taking place as a result of altering social circumstances.

4. As an Index of the Psychological (or Social) Health of a Community: There seems to be some relationship between the rising incidence of the psychosomatic affections and the decline in the birth rate. Indeed these, together with the suicide rate, may be regarded as indices of the psychological or social health of the community. I quote a paragraph from the communication (6) in which these matters were discussed:—

> Until recently it was customary to regard the public health in terms of physical health alone. Thus before the war it was generally stated, and accepted, that the public health of Britain was "improving" in response to the improvement of various physical social factors, *e.g.*, improper feeding, impure water and food, poor housing, inadequate exercise, improper clothing, etc. The indices used to support this proposition were the declining rates referring to medical events known to have a primary etiological relationship to the communal environment considered physically. Measurements adopted as a yardstick of the public health included, accordingly, death rates, infant mortality rates, the expectation of life, tuberculosis and infectious disease rates, the height and weight of school children, etc. But the public health is Janus-faced, and at a time when its physical side was brightening, its psychological side was seen to be darkening by those who cared to look at it. The decline in psychological health was revealed by a different series of indices whose trend took a direction not towards improvement but towards deterioration. These referred to medical happenings demonstrated to have a primary etiological relationship to psychological factors of the environment. They comprised not only the increasing national sterility (as revealed in the declining birth rate) but also the rising rates for suicide, for psychoneurotic illness and for the numerous organic diseases now subsumed under the head of the "psychosomatic affections," *e.g.*, "gastritis," peptic ulcer, "fibrositis," exophthalmic goiter, diabetes, hypertensive cardiovascular disorders (including certain cases of coronary thrombosis and cerebral haemorrhage) etc. The increase in frequency of these morbid happenings could be interpreted broadly as a response to a progressive increase in noxious pressure of the communal environment considered psychologically, *e.g.*, mass unemployment, financial crises, increasing competition, decline of active religious faith, the loss of an end in view, and a general tendency to drift and safety first.

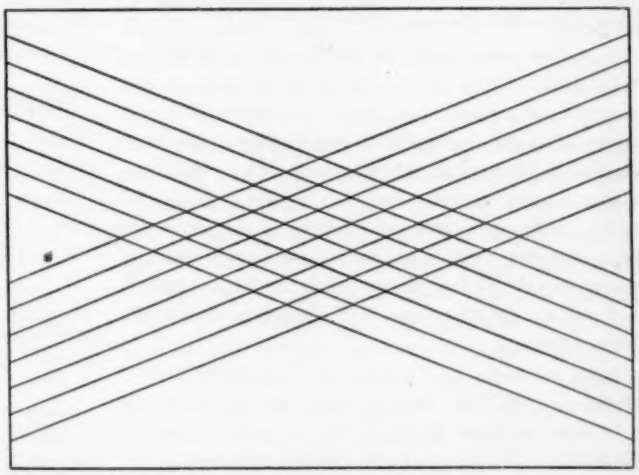
The notion of the *physical and psychological health* of a community may be represented diagramatically. The enclosed figure is an attempt to illustrate the trends of physical and psychological health in Great Britain (1900-1939). It will be seen how the trends took opposing directions. As the figure does not indicate the differential rates of increase and decrease it should not be taken over-literally. Its sole aim is to picture an idea in outline.

(D) FURTHER REFINEMENT OF THE CONCEPT OF A PSYCHOSOMATIC AFFECTION

Consideration of the incidence of the psychosomatic affections (5) enables the concept to be further refined as follows:

> A psychosomatic affection is a disorder that complies with the 6-point formulation, and whose incidence rises or falls in accordance with the rise and fall of communal "upsetting events," *i.e.*, in accordance with the pressure of environment (or environmental flux) in its psychological, as distinguished from its physical aspects.

SCHEMATIC REPRESENTATION OF THE IDEA OF PHYSICAL AND PSYCHOLOGICAL HEALTH
Based on the Trend of Health in Britain (1900-1939)



Note: The items regarded as indexes of "Physical Health" refer to diseases and morbid happenings which are primarily etiologically related to environment in its physical, chemical and micro-organic aspects. The items regarded as indexes of "Psychological or Social Health" refer to diseases and morbid happenings which are primarily etiologically related to environment in its psychological aspects. For the purpose of this diagram the declining birth-rate has been regarded as an increasing sterility rate. The differential rates of increase or decrease are not shown as the aim of the diagram is to illustrate, in a broad way, the notions of physical and social health. In this respect the statistician may regard the figure as "misleading," but the student is more likely to regard it as illuminating.

Comment: The diagram shows how, during the present century, the trend of Physical Health steadily improved whereas the trend of Social Health took an opposite direction. In other words the "good life" in the sense of insurance companies was becoming less frustrated, whereas the "good life" in the sense of the philosophers was becoming increasingly frustrated. The rates of the frequency of sterility, of suicide, and of the psychosomatic affections represent the medical indices only of a morbid process which has been variously designated as "Western Civilization," "The socio-economic capitalist set-up," "The break-up of a culture," etc. From the medical point of view the best name for the communal *morbus* is "Social Disintegration." There are other indices of Social Disintegration in terms of other interests, *e.g.*, Industrial, Religious, Cultural, etc.

DISCUSSION

After all it is better to set out boldly and with intention rather than to wander round declaring there is neither road nor sign post.

—F. G. Crookshank, in the Appendix to *The Meaning of Meaning.*

At the beginning of this paper I stated that I agreed with the Editors' statement that "the method of approach called psychosomatic medicine could be applied to the whole field of medicine." At this point I wish to suggest that a definition of the scope of the psychosomatic approach is clearly an irrelevancy as a ground of objection to the usage of a verbal term. An appropriate basis for an objection of this nature requires the "semantic approach" which takes cognizance of Things (referents), Thoughts (references), and Words (symbols for referents and references).

Viewed semantically, "psychosomatic affection" is a symbol. The facts from which it was derived (*i.e.*, its referents) are well enough established, and the inferences made from these referents (*i.e.*, its references) are legitimate and logical. I therefore see no reason to alter the conclusion to the contribution (4) in which I originally introduced the expression:

> The concept of a psychosomatic affection in its developed form brings into relationship a large number of seemingly unrelated facts. The outlook gained shows that many "localized diseases," the names of which have hitherto been found scattered throughout textbooks of medicine under the headings of the various anatomical systems, may now be grouped under a unifying etiological category. The term psychosomatic affection is therefore a valid symbol which provides a new instrument for thinking, for investigation and for the direction of action.

But these conclusions in no sense imply that with further investigation further referents may not be discovered which will require us to alter the present reference and also perhaps to modify its symbolization. Indeed it is after such a manner that scientific knowledge advances.

SUMMARY

1. The mental construct (or concept) symbolized by the term *psychosomatic affection* is in no way imposed upon facts but is derived from the arrangement of the facts themselves.

2. It has proved itself pragmatically justified—it fits and it works—and it has important practical applications, especially in vital statistics, epidemiology and applied social medicine.

3. Far from being "arbitrary" it has a genuine creative value.

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INTEGRAL MEDICINE: A NEW TERM

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The psychosomatic approach to medical problems is a concept for which it has been difficult to find an appropriate label. Persons unfamiliar with the concept, especially members of the lay public to whom the term and its concept are new and unfamiliar, find "psychosomatic" a little stilted, unattractively complicated, and intelligible only after effort to understand it. Physicians, even those who are engaged in the field of psychosomatic medicine, while recognizing that the term bridges the two constituent areas, mind and body, recognize also that the term preserves the dichotomy into those areas. "Psychosomatic" is essentially a compound term that falls short of achieving the oneness that is desired but yet is actually unrealized by many persons who have adopted that term. It is a compromise between the traditional but now outmoded two groupings of which some fusion, not only cooperation, is desired or indeed required for the optimal comprehension and development of medicine as applied to total man.

As recently as 1938 Flanders Dunbar, the worker who has advanced so constructively the concept of psychosomatic medicine and has explored so rewardingly its enormous realm, wrote, with too much resignation, "The dichotomy persisting in medical thought and practice will not be eliminated by a word better expressive of the unity of the organism. . . . So rather than side-step this difficulty, let us continue to hold the word before us as a reminder of the problem of unification that confronts us. What is disquieting in it will become a self-limiting phase as we progress. When medicine has apprehended the psychosomatic problem and assimilated it, the adjective will be obsolete; all medicine will be psychosomatic." [1]

[1] Dunbar, Flanders: Emotions and Bodily Changes. New York, Columbia University Press, 1938, pp. 19-20.

So far as I am able to determine, no one has proposed what may be regarded as a superior or even ultimate term, "integral," in lieu of "psychosomatic." "Integral medicine" suggests immediately, totally, and clearly what we have always had in mind when thinking, speaking, investigating, and practising in the domain of "psychosomatic medicine." The regretted dichotomy disappears, yet at the same time the oneness, the fusion, in fact the integration of all conceptual medicine is explicit in the new term.

Webster's dictionary reads, "Integral, a. (LL. *integralis,* from L. *integer,* whole, entire.) 1. Whole; entire; wanting nothing; complete as an entity. 2. Making part of a whole, or necessary to make a whole. n. A whole; an entire thing; an individual."

Those definitions seem to fit exactly what workers in our field have in mind. Moreover, a small number of lay and of professional persons on whom the new term has been tested have at once grasped its meaning; and this simplicity or transparency of meaning is something which we physicians have sought but failed to find in the older terms.

For all of these reasons, I propose the term, *integral medicine.* Perhaps specialists within its field may be called *integralists.* Precedence for such usage exists in the familiar but less accurate terms, "internal medicine" and "internist" that are now accepted in our nomenclature.

I should expect reluctance to use the new term in at least two groups: the pioneers in the adoption of "psychosomatic," and many who have become so comfortably conditioned to it that change does not seem worthwhile. Yet it is possible that the new term, integral medicine, will in time make a better technical and popular appeal than its predecessors and that thereby it will promote the concept which it designates.

IMPLICATIONS OF GENERAL SEMANTICS FOR PSYCHOSOMATIC MEDICINE

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General semantics, like psychosomatic medicine (6), rests explicitly on the assumptions of organism-as-a-whole-in-environments and multicausality. General semantics arose out of an investigation (9) of the difference between $Smith_1$ and $Fido_1$, which difference was found to be the ability of $Smith_1$ to begin building verbal and concrete structures and collecting data where previous generations left off.

Korzybski called this characteristic ability *time-binding*, and set out to find its mechanism, which led to a study of man at his "best" (science and mathematics) and at his "worst" (psychiatric illness).

Unexpected results followed, and these were systematized in general semantics (10), "a new branch of empirical natural science, underlying a general theory of human evaluations and orientations . . . . general semantics is concerned with the linguistic and semantic mechanisms which function in human nervous systems to condition our knowledge, activities and adjustments in life."

Korzybski pointed out previously disregarded factors in the structure of language which in principle lead to delusional, false to fact "thinking" because the structure of our language does not fit the world known to science, 1945. Verbally, for example, we can split a man into "body" *and* "mind," but try doing it empirically. Only in modern physics and mathematics did Korzybski find languages whose structure was similar to the structure of the human nervous system and the world.

The term *semantic reaction* representing an organism-as-a-whole-in-environments response to events, symbols, words, etc., in connection with their values, was introduced. Korzybski demonstrated that we disregarded the *verbal environment* of opinions, doctrines, creeds, etc., based on a language of primitive outmoded structure. We are unaware of the organismal effects on us of our associates' reactions, and as unconscious of the attitudes and evaluations surrounding us as of the air we breath. In a word, we disregard the neuro-linguistic and neuro-semantic environment *as environment*.

Freud and Burlingham (7) give many instances of infants who were anxious or not during air raids depending on whether their mothers had been anxious or not—excellent examples of the environment of evaluations at work.

From his extensive studies of the structural methodological aspects of modern physics (including quantum mechanics and colloidal chemistry), mathematics, psychiatry, neurology and epistomology, Korzybski came to the explicit denial of the aristotelian "laws of thought," and the formulation of a non-aristotelian system of orientations to replace the present aristotelian one, just as euclidean geometry was replaced by many non-euclidean geometries, and newtonian physics by non-newtonian einsteinian physics.

In addition to this, *general* workable devices were established to train individuals in general semantics (one possible non-aristotelian system) so as to promote proper evaluation, which is based on predictability, and beneficial semantic reactions; in a word, sanity.

It is not my intention here to summarize general semantics, as this has been done adequately elsewhere (2, 3, 4, 11, 12, 13, 14). I want to point out the possible contributions general semantics can make to workers in psychosomatic medicine.

In formulating theories (linguistic structures) and in describing observations, workers in psychosomatic medicine are unavoidably handicapped at this date because theirs is a hybrid discipline, stemming from physiology and medical psychology. There is the difficulty of changing from a "body" *and* "mind" to a body-mind system.

We need to be acutely aware of the fundamental change in our "thinking habits" involved in acquiring a body-mind, organism-as-a-whole, *psychosomatic* attitude, and of the enormous difficulties faced in switching from one system to another. For what we are attempting is no less than a change from an aristotelian, static, elementalistic, either-or system which splits the organism, etc., to a non-aristotelian, dynamic, non-elementalistic, multivalued system which considers the organism-as-a-whole-in-environments and is structurally similar to our nervous systems and the world of science.

Quotations like the following from authors of books on psychosomatic medicine remind us that doctors as a class have been intensively and practically exclusively trained in the organic ("body" *and* "mind," "emotions" *and* "intellect," etc.) tradition, and they will acquire a psychosomatic attitude only with considerable difficulty. I realize that what counts is the attitude of the writer or teacher, if this be the coveted psychosomatic viewpoint, but sloppy formulations, despite a psychosomatic approach, will hinder training in a psychosomatic orientation and confuse the student (*cf.* 16).

> The problem of psychosomatic medicine must always remain the fundamental relation between psyche and soma but instead of speaking of either/or, we have got to learn to talk in terms of the complementary relationship of many factors (18).

Of course this organismal concept changes our focus both from that of anatomical pathology and from that of the functionalists who, in searching for the origin of a given illness, assume that they must choose between physiogenesis and psychogenesis. In order to understand disease processes we must give up the "either or" type of thinking and shift our emphasis to "both and" (6).

I submit that if we have a psychosomatic (organism-environment continuum) outlook the "problem" of the "fundamental relation between psyche and soma" will not exist, because that "problem" is a pseudo-problem based on the structure of our language, which does not fit the world of scientific facts. For as we know, we deal in life with non-split individuals.

The change from "body" *and* "mind" to body-mind is similar to and as far-reaching as that made by the physicists in going from "space" *and* "time" to space-time. The *and* has tremendous structural implications in the old aristotelian language. It involves additivity and linearity, not to be found (except as special cases) in a functional, dynamic, non-elementalistic system (10, pp. 603-608). That is why physicists now speak of space-time with a hyphen. Psychosomatic physicians should do likewise with the verbal, false to fact, dichotomies in medicine.

General semantics clearly formulates the wider structural issues underlying multicausality and a psychosomatic attitude, and provides general devices for facilitating the change, among others, from the old "body" *and* "mind" viewpoint to a new organism-environment outlook.

Psychosomatic medicine lacks psychosomatic terms. In reporting psychosomatic phenomena, there is the problem of "how to say it."

General semantics provides several psychosomatic terms and the principles of a new, scientifically sound, well-adapted nomenclature. Campbell writes (4):

> A few new terms replace obsolete ones and the extensional devices change the structure of others. . . . . The term *abstracting* is applicable at all levels of neural functioning whether physio-chemical or symbolic. *Evaluation* replaces the never resolved dichotomy of 'intellect' and/or 'emotion' with a non-elementalistic term covering both aspects of a unitary process. Both terms, being general, can be given specific or extensional content by referring to particular levels or types of abstracting or evaluating. . . . . The extensional devices of *indexing, dating,* and the free use of *etcetera* or its equivalents, together with the liberal use of *quotation marks* and *hyphens* when applied to ordinary, static terminology, confer flexibility, differentiation and a dynamic structure to statements.

While the general educational benefits of training in general semantics are well established (1, 8), its possibilities and usefulness in psychotherapy have not been determined. It is not considered a psychotherapy in itself, but can be used directly with some "mildly" maladjusted patients, or indirectly in helping the physician sharpen his formulations to the patient, thus shortening the treatment period. Psychotherapeutic applications are discussed by Campbell (4) and others (5, 14, 15, 17).

Korzybski insists that modern physico-mathematical *methods* are prior to any science, psychiatry and psychosomatic medicine included.

SUMMARY

It is suggested that workers in psychosomatic medicine can find in general semantics, an empirical science dealing, among others, with organismal reactions to events and symbols and events in connection with their life-values:

1. new psychosomatic terms which psychosomatic medicine lacks, and the principles for creating a psychosomatic nomenclature and theory-system;

2. the wider, *general,* structural foundations, based on modern physics, mathematics and linguistics, which underlie psychosomatic considerations;

3. recognition and correction of linguistic factors which unavoidably condition our reactions and evaluations;

4. a non-aristotelian system which provides a bridging term between physico-mathematical disciplines and biological sciences; and

5. general education and therapeutic means (useful to both physician and patient) for changing from the old "body" *and* "mind" system to a new psychosomatic attitude. General semantics helps the physician sharpen his formulations to the patient and thus shortens psychotherapy. The extent of its psychotherapeutic usefulness is still to be determined.

Korzybski makes this summary statement (14):

> General semantics is not a medical science, but like bacteriology, it is essential to general medicine and psychiatry. The orothodox medicine without psychiatry and psychosomatic considerations represents nothing but glorified veterinary science. Psychiatry [psychosomatic medicine] and psychotherapy without general semantics cannot help but involve metaphysical factors.

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NOTICE

Lieutenant Commander Louis A. Schwartz has asked us to report that his new address is USS Refuge, AH 11, c/o Fleet Post Office, San Francisco, California.

REVIEWS OF PERIODICAL LITERATURE

ASTRATYAN, E. A.: *A new method for the treatment of traumatic shock.* Am. Rev. Soviet Med. **1**:37, 1944.

This paper discusses Pavlov's concept of the protective and curative role of somatic rest and confirms its application to physiologic and pathologic cerebrospinal conditions and to all diseases associated with nervous cachexia and asthenia. Confirmation of Pavlov's concept was obtained in experiments by treatment of traumatic shock through sleep induced by hypnotics. The theory also explains the therapeutic value of sedative and hypnotic drugs, hitherto considered only as protective substances.

Sleep therapy alone, however, the author concludes, does not have a similar effect in all cases. Other therapeutic measures must be adopted in addition. It is, moreover, necessary to consider the central nervous area affected in each phase of shock, and to gauge the optimal amount and depth of sleep, to select the most suitable drug for inducing it and to determine the most effective method of administration.

The solution described in the paper was developed to combine sedation with chemicals producing regulatory changes in the blood, vasomotor system and metabolism. The solution comprised salines, bromides and a hypnotic, preferably hedonal. It was first tried experimentally, then clinically on 110 cases of traumatic shock.

When administered intravenously by the drip method, the solution produced sleep, raised blood pressure, produced a temporary rise in body temperature, and soon brought the patient out of shock. In all cases recovery from traumatic shock was uneventful. (F.V.L.)

SELYE, HANS, AND MACLEAN, ALAN: *Prevention of gastric ulcer formation during the alarm reaction.* Am. J. Digestive Dis. **10**:319, 1944.

This paper discusses experiments with albino rats which indicate that the gastric ulcers which appear in the course of a severe alarm reaction may be prevented by the prophylactic administration of various food substances, aluminum hydroxide gel, and especially by comparatively small doses of dextrose. Dextrose is effective when given either per os or intravenously. It prevents gastric ulcer formation even in doses insufficient to raise the glucose content of the blood above the normal level for the duration of the experiment. The prophylactic effect of dextrose is nonspecific in the sense that the compound prevents the formation of gastric ulcers by a variety of widely different damaging agents such as formaldehyde injections, exposure to cold or spinal cord transection. (In the instant experiments the "alarm reaction" was produced by high spinal cord transection.) (F.V.L.)

FRIEDMAN, A. P., AND ROY, J. E.: *An unusual familial syndrome.* J. Nerv. Ment. Dis., **99**:42, 1944.

This paper describes a family which consisted of 6 feeble-minded children of parents of normal intelligence. The children ranged in age from 7 to 17 years. No child had a mental age above 3 years; all but one had internal strabismus; all but one had foot or leg deformities and all had bilateral positive Babinski or Gordon reflexes. The electroencephalograms of all the siblings and the mother were very similar. The mother also has internal strabismus and an Oppenheim plantar reflex. The authors posit that all the siblings inherited the same nervous system defect. (F.V.L.)

GASKILL, HERBERT S., AND FITZ-HUGH, THOMAS: *Toxic psychoses following atabrine.* Bull. U. S. Army Med. Dept., **86**:63, 1945.

Thirty-five cases of toxic psychosis following atabrine have been observed among 7,604 atabrine-treated cases of malaria in a period of 7 months, by the authors. They note the psychosis begins either during the course of atabrine therapy or shortly after its conclusion. There are two main types of onset. The most frequent (75%) is marked by excitement, hallucinations and delusions. The other (35%) begins with retardation, disorientation and amnesia for recent events, together with confabulation. No constant physical or laboratory findings are present. Aside from supervision, sedation, restraint and nursing care, the authors note no specific therapeutic measures as useful.

The course of the psychosis has been benign in most instances. There was no evidence to suggest that these men were psychiatrically unstable. The authors believe atabrine to be the etiological agent. They hypothesize an acute, possibly conditioned, sensitivity to atabrine in which the initial attack desensitizes the patient for at least several months. During this period atabrine may be readministered safely to these individuals. The authors emphasize, however, that they are unable to state that at a later date these patients may not again become sensitive to atabrine. They therefore advise caution in the treatment with atabrine of malaria relapses or reinfections in patients who have had a toxic psychosis of this type. Two of the instant patients developed a second attack of malaria and were retreated with atabrine within 20 to 26 days after onset of the psychosis without reproducing a second

psychotic episode. Fourteen additional patients, after recovery from this type of psychosis, making a total of 16 cases, were retested with atabrine, and only one case showed any untoward reaction. This was a mild excitement which cleared within 24 hours.

The total incidence of such psychoses which complicate malarial cases treated with atabrine is extremely small (0.4%) and their course is relatively benign since 33 of the 35 cases recovered without incident. The two unrecovered cases developed typical schizophrenic reactions apparently precipitated by the malaria-atabrine episode. Their pre-breakdown personality gave no hint of a latent psychosis. (F.V.L.)

KALINOWSKY, LOTHAR B.: *Convulsions in nonepileptic patients on withdrawal of barbiturates, alcohol and other drugs.* Arch. Neur. & Psych., **48**: 946, 1942.

This paper discusses the cases of 7 non-epileptic patients who had convulsions four days after withdrawal of soluble barbital. They had been accustomed to this sedative for one to two years. None of them had seizures prior to or after this occurrence.

The author notes that seizures occur after withdrawal of various barbiturates, paraeldehyde and other hypnotics of the aliphatic group. They are seen only after prolonged medication, never after acute intoxication with the same drugs.

The dangerous increase of seizures in epileptic persons following sudden discontinuance of phenobarbital is explainable by the same mechanism. It seems that in this respect phenobarbital acts differently from other nonconvulsive drugs, such as bromides and dilantin.

The literature on withdrawal seizures after chronic intoxication with such hypnotics as barbiturates and paraldehyde reveals that these convulsions, in most instances, are associated with a delirium-like psychosis of several days' duration.

Withdrawal seems to be equally responsible for convulsions in cases of so-called alcohol epilepsy. Alcohol in large doses is a narcotic and fits occur only during the sobering-up process, as demonstrated in two cases reported in this paper. The possible relation between alcoholic delirium and seizures, and the analagous manifestations in intoxication with barbiturates and paraldehyde are discussed.

Ether convulsions are mentioned as not belonging in the group of withdrawal seizures.

The time interval between withdrawal and convulsions or psychosis is rather constant for each drug.

No immediate action of the drug, but some unknown physiochemical process developing after withdrawal in a chronically intoxicated patient, seems responsible for both the convulsions and the withdrawal psychosis. (F.V.L.)

WOLBERG, LEWIS R. *Psychosomatic correlations in migraine.* Psychiat. Quart., **19**:60, 1945.

In the course of treatment of a 28-year-old male with anxiety hysteria and migrainous attacks, which had occurred bimonthly for a period of 16 years and which the patient had completely dissociated from his phobic disorder, came to a dramatic and complete halt. The patient's migraine vanished before he gained insight into some of his deeper problems. The author postulates that it is possible where migraine "burns itself out" with advancing years, or where a spontaneous cure develops, that the character structure has altered itself so that hostility is either diminished or its outward expression enhanced. He adds that diversion of hostility from autonomic channels can occur without awareness of the patient of many of his deeper problems and conflicts. (F.V.L.)

BERGLER, EDMUND: *On the disease-entity boredom ("alysosis") and its psychopathology.* Psychiat. Quart., **19**:38, 1945.

The author discusses boredom as a disease-entity associated, in a triad of disturbances in the sphere of sublimation, with scopophilia and psychic masochism. It represents, the author concludes, an unsuccessful defense mechanism of the unconscious ego against reproaches of the inner conscience. These reproaches, the author notes, are often more or less in the form of a "raid," and do not progress to a real offensive. In such cases, he observes, boredom represents only a transitory, though repeated phase, encountered in many neuroses in which, in addition to other difficulties, voyeurism is impaired. Conclusions as to the underlying drives which boredom wards off are possible from its visible "psychosomatic" signs, whether the bored person is fidgety and motorically agitated or is without motoric impulses. (F.V.L.)

BOOK REVIEWS

REES, JOHN R.: *The Shaping of Psychiatry by War.* New York, W. W. Norton & Co., 1945, 154 pp. $2.50.

At the outset this reviewer considers that this work is a "must" for the satisfactory indoctrination of all medical officers in the Armed Services regardless of what branch they may serve. It is indispensable for social workers, administrators, employment managers and personnel counselers. Although certain aspects are more technical, the general information is an invaluable aid in acquainting those whose responsibility it is to deal with the returning veterans and affords insight as to the personalities which have evolved out of the stress of war.

In this book the Consulting Psychiatrist to the British Army presents a review of psychiatry in war and suggests its role in the peacetime that lies ahead. The experiences of war opened up new responsibilities for the psychiatrist and gave new emphasis to the army doctor and the military psychiatrist. "There is no time and no experience in our whole social life," says Dr. Rees, "in which psychological principles are so challenged as in war; psychiatry has perhaps matured more as a result of war experience than it could have done in years of peace." Brigadier Rees shows how the realities of war led to new developments in intelligence and aptitude tests, selection of officer candidates, and study of character, personality, leadership and stability. He shows how army needs made urgent such problems as training methods, morale and discipline and the resocialization of the sick and wounded—problems that have their important applications in civilian life as well. Keenly aware of the social aspects of psychiatry, the author stresses the importance of morale in both military and civilian life, and looks forward to the part psychiatry can play in solving problems of mental health in communities and nations.

Brigadier Rees is one of Great Britain's leading psychiatrists and an outstanding figure in the Allied military effort. He saw service in World War I and, subsequently, as Neurological Specialist in the Ministry of Pensions. To his work as Consulting Psychiatrist in the present war belongs much of the credit for the fine organization of the psychiatric division of the British Army Medical Service and its co-operative efforts with the Allied divisions. In his book he reflects the concern of the whole profession in its efforts to build a sound postwar society.

Of special significance is his emphasis on morale and the need to develop the combatant spirit that is necessary to establish the values for which we fight. He emphasizes that the medical officer is an essential part of whatever unit he is with and his sympathetic understanding, coupled with kindly firmness, gives him an enviable position in which he is trusted and respected by nearly everyone. This concept is of significance because the task of the doctor in the Armed Forces, with its influence over individual officers and men, points the way that the physician and medicine should occupy not only in the planning of methods for maintaining health but also of the larger sociological issues that concern groups, communities and nations.

In the United States we could readily accept the English point of view, namely that many of the large number of men with chronic neuroses, those who were constitutionally predisposed, were competent and able people who clearly had some contribution to make to the Army in war if they were kept stable and fit. One experiment was tried by which men of this type were drafted into labour companies whose entire job was agriculture. The farmers throughout England and the agricultural committees responsible for improving the output of the land were very short of labour so that agricultural work, for the most part unskilled, was not only welcomed but was a matter of some importance and was easily comprehended as a contribution to the war effort. These men were in agricultural companies which were run on a basis of military discipline less strict than the normal. The result was that where men had been reasonably well selected for this job they did good work, went sick very little and had good morale. This did not produce cures but it did provide work and an environment that allowed the neurotic men to contribute without coming under greater stress.

Another especially significant aspect of this program was an arrangement that was made for men—who, after treatment in special neurosis centers, were felt to be unfit to return to military duty except in some special occupation—to have their particular job found for them. The follow-up showed that 50% of a very large group of men treated in terms of case assessment of the man's capabilities resulted in a large number so treated continuing to give good service without development of nervousness, sickness or disciplinary troubles.

In England there has been a wide utilization of the principles of limited service due to the different manpower positions. Dr. Rees cites the experience of the Canadian Army as to the three-speed training where the above average, the average and the below average are grouped separately so the varying times to reach the same point of competency can insure better training and improve the morale. The duller men are in

the slower group and the Canadian Army is doing what schools have adopted for many years in principle.

He stresses that for long there has been an idea that the discipline of the Army is what will "make a man" out of all sorts of inadequate people. Without first-class discipline no Army can function satisfactorily. It is, therefore, our job to see that the soldier understands and accepts discipline voluntarily, welcomes it and, indeed, prides himself in the activities of a well disciplined unit. In civil life equally, threats, prosecution and penalties do little to check absenteeism and strikes.

As to treatment Dr. Rees states that in England the incidence of psychotics has been lower than was anticipated and, in the British Army, these men have been able to be kept in the Army up to nine months if necessary while they have treatment in military hospitals. This has avoided certification or unduly rapid discharge. In fact in areas like the Middle East where the question of transport home was an extremely difficult problem, many recovered psychotics went back to work and did well.

In battle neurosis Dr. Rees states that, "There are still some people, and alas some of them are doctors, who believe that no man should break down in battle and certainly no one should be 'allowed' to break down. Behind this belief is the idea that somehow courage and cowardice are alternative free choices that come to every man, overriding all emotional stress, that a man can choose which he prefers, or that he can be courageous if he is told he must be. This again is a reflection on our past failures to give a sensible education to laymen and indeed to our own colleagues, but it can be recorded that compared with the last war things are very much better and there is far more understanding in the army with which I am best acquainted. Nearly all training manuals do refer to the fact that fear is a universal and in its right place a beneficent reaction, but it takes a good deal to live down the early teaching of childhood. And the textbooks have been unheeded by those who are themselves ashamed and frightened of their own feelings of fear. It is interesting to note, however, that men are on the whole less scared of being afraid and consequently more inclined, when they do crack, to react by straight anxiety rather than by the development of conversion symptoms. That is certainly some small advance. But we have inevitably got a residual problem that we are never likely to resolve completely in the correct management of anxiety and fear.

"There is no doubt that the man who is breaking down with acute anxiety is very bad for his unit and likely to 'infect' other men. Those who have up to that time been controlling their anxiety reasonably well must of necessity have it revived since they share to some degree the emotions of their colleagues. . . . . Whether it is the task of the doctor to decide where uncontrollable fear ends and cowardice becomes dominant is still an unsolved issue. There certainly are cases of cowardice with deliberate evasion of dangerous front-line duty, but most people are hesitant, and I think rightly so, to attach the label of cowardice or lack of moral fibre to a man showing any of the physical signs of anxiety: they are difficult to create artificially."

Dr. Rees says that the neuroses of battle have provided us with certain opportunities. "Some recent work (at Mill Hill Neurosis Center, England) on the relative value for abreactive purposes of ordinary sedation, pentothal and hypnosis has provided a healthy reminder that the results of all three are fairly comparable and that the pentothal method is primarily of advantage for its speed when the doctor is overworked or for some resistant cases of amnesia."

This method has been used in this country at many of the Naval hospitals particularly. On the whole the man with neurosis is better treated as an outpatient, and it is very desirable that he should continue his work while having treatments.

In conclusion Dr. Rees states that, "If people think this is the time to widen our horizon, to increase our activities and to alter some of the emphasis that we have placed on various aspects of our work, we shall certainly have internal as well as external difficulties. We are too much dominated by clinical interest, by the burden of the psychoses and by local government. If we are sufficiently enthusiastic and are prepared to select ourselves, we can fight through these various obstacles and, improving all that now exists, we can add to our work new and more profitable projects, some of which are touched upon in these chapters. There can be, in fact, no conclusion; there really is no end to our task, for all the time we shall find ourselves coming afresh to the beginning."

LOUIS A. SCHWARTZ

HENRY, CHARLES E.: *Electroencephalograms of Normal Children*. Washington, Society for Research in Child Development. Vol. IX, No. 3, 1945, 71 pp. $1.50.

The unfolding of knowledge of electroencephalography has followed an unfortunate pattern: work on the abnormal subject has in general preceded work on the normal, so that the assessment of electroencephalographic records has been based on insufficient standards of normality.

In this monograph from the Brush Foundation,

electroencephalographers now have a reliable yardstick by which to measure the records of children. This report is based on a study of almost 4000 electroencephalographic records on 890 normal children between the ages of 3 months and 19 years.

The report has been sectionalized, one part dealing with data obtained from 95 normal children each of whom had repeated tests extending over a period of at least 5 years. Data are given for the mean alpha frequencies from bipolar occipital leads obtained by making 10 counts of 5 consecutive waves. The range of frequencies designated as "alpha" in this study is wider than that in current use in work with adults, since it was found that in children there are many with waves slower than 8 per second and faster than 12 per second that block to light. This criterion of "blocking to light" was therefore used to establish the alpha range.

The results show an exponential curve for the relationship between increasing age and alpha frequency in children, with almost all values lying between 9 and 11 per second after about the age of 6. Low voltage fast records were not present below 12 years of age but were most common at age 17 with a greater incidence among girls than boys. There was a tendency for girls to have faster mean alpha frequencies than boys at every age level between 5 and 17.

The second section of the report also deals with mean alpha frequencies but the data here is collected from 540 single tests on a further group of normal children between 4 and 19. It gives essentially the same shaped curve for relationship between age and frequency. The results show that the mean alpha frequency reaches the adult level of 10 per second between the ages of 13 and 14. Again above the age of 11 or 12 there was a tendency for girls to have faster frequencies than boys.

The third section of this monograph deals with measurements of slow activity—the type of waves which contribute most towards the electroencephalographer's judgment as to the normality or otherwise of a record, and this section supplies very valuable criteria for such work. In previous reports from other workers who have studied "behavior problem" children, children with psychiatric disorders and delinquency problems, slow activity has usually been emphasized as the principal abnormality in such records without any adequate standard of the amount of slow activity occurring in normal children of the same age.

In the context of this monograph the author defines delta activity as waves slower than 7.5 per second for reasons which he elaborates; determination of percent time delta was based on measurements of at least two one-meter samples of each record.

The results show that all children have delta activity in their resting records. Sixty-one percent of normal children between the ages of 7 and 13 have at least 10% delta in their occipital leads, and 24% of these children have at least as much as 20% delta. No sex difference was found.

It is clear from these results that the presence of delta activity in a child's record does not serve to differentiate the behavior problem from the normal even up to the age of 19. Some quantitative threshold (such as 20%) has to be decided upon before differentiation can be made on this basis and in any case delta activity alone cannot be the basis for abnormality. Delta as high as 92% was found in the occipital leads of one normal aged 18.

Finally a study was made to detect any correlation between the electroencephalogram and other measures in children, such as I.Q., skeletal maturity, onset of menses, but no statistically significant relationship could be established. Some correlations between the various electroencephalographic characteristics themselves were established as significant, as might be expected; for example, between the per cent time delta from the occipital and central regions, between per cent time delta and delta frequency, and (inversely) between delta frequency and voltage.

This monograph will be an invaluable aid to all electroencephalographers who are faced with the problem of interpreting the records of children. But it is to be hoped that it will be more than this: that it will be an inspiration to electroencephalographers to seek more precise knowledge of the characteristics of the normal electroencephalogram before giving judgments as to the "abnormal."

MARY A. B. BRAZIER

HIRSCHFELD, MAGNUS. *Sexual Anomalies.* New York, Emerson Books, Inc., 1944. 630 pp. $4.95.

Sexual Anomalies—while posthumously compiled from Hirschfeld's notes by his pupils, and consequently not a product of his own pen—is quite typical of his writings. Its scope is wide, in that it endeavors to catalogue, classify, and analyze every major sexual aberration. Its style is painstakingly lucid, suitable alike for professional and lay reading. And its liberality and humaneness, its eagerness to understand and aid, rather than condemn and imprison, the sexual deviate are consistently laudable.

Nevertheless, there is much that is unscientific, and more that is highly questionable in this work, just as there is in the author's *Sexual Pathology, Men and Women, Sexual History of the World War, Natural Laws of Love,* and other writings. Hirschfeld, beginning his sexual studies late in the last century, when

it seemed to many that all psychosexual phenomena would soon be explicable in terms of purely physiological, and particularly hormonal, etiology, became an outstanding proponent of chemical, constitutional, and hereditarian views of sexuality. Although he later studied Freudian concepts, and in *Sexual Anomalies* widely quotes Freud and Stekel, he never really paid more than cursory lip service to sexual insights arrived at by depth psychological analysis. Far from being psychosomatic, his viewpoint was always belligerantly somatic, with the psychogenic aspects of sexual behavior being fairly noted but most inadequately developed.

For example, throughout *Sexual Anomalies,* many debatable statements like the following are dogmatically presented as truisms. "Psychosexual infantilism is in the majority of cases accompanied by an impeded development of the sexual glands." (p. 94). "Today . . . the view is universally accepted that in genuine homosexuality the peculiar mentality is an expression of physical constitution." (p. 227). "It is certain that hereditary factors play an important role in the genesis of homosexuality, which would in any case appear to be eminently probable in such a distinctly congenital phenomenon as homosexuality." (p. 278). "Exhibitionism is . . . a symptom of a general disease of the central nervous system." (p. 609). For these, and many similar, one-sided allegations, no objective proof whatever is given in this work.

To make matters worse, either Hirschfeld or his compilers have managed to make many statements of indubitable inaccuracy in this volume. Thus, the case of the notorious hermaphrodite, Catherine Hohmann, is said to be completely authenticated when, in fact, she was definitely proven to be a fraud. Again, Krafft-Ebing is set down as seeing homosexuality as congenital degeneracy in his *revised* view; when, actually, this was his *early* view, which he subsequently revised to the opposite effect. Many similar minor and major factual inaccuracies will be found.

Several other shortcomings of this work will be plainly evident to the professional reader. It makes no use whatever of recent objective sex studies, nor of any psychosomatic findings. It frequently "explains" sexual anomalies by quoting an isolated case or two. It consistently uses questionable sources and gives no precise references to them. It is replete with biased, personalized viewpoints. It contains no index to its more than 600 closely packed pages. And, from a medical standpoint, it entirely belies its subtitle—"the origins, nature and treatment of sexual disorders"—by giving only the barest hints as to prognosis and treatment of the many sexual aberrations that it describes.

Although *Sexual Anomalies* gives, in clear and brief form, a fairly comprehensive outline of the main human sexual deviations, and while it is an adequate summary of the works of a renowned sexual pioneer and liberal, it adds little to our insight into the etiology of the anomalies which it describes, and, by ignoring the most notable recent advances in the field, leaves the science of sex little farther advanced from its state of a half century ago.

ALBERT ELLIS

STEKEL, WILLIAM: *The Interpretation of Dreams; New Developments and Technique.* Vols. I & II. New York, Liveright, 1944, 310 pp. & 312 pp. $10.00.

In these two volumes many papers of Stekel are collected, covering a wide field of the author's research concerning dreams, and giving a good illustration of his clinical experience. After the introductory chapters he goes into the details of his special interest, the symbolism of dreams. One chapter deals with religious symbols another one with individual symbols. A special chapter is devoted to dreams in analysis, and, in another chapter, he gives his analysis of dream series. Of special interest is the chapter concerning the importance of intuition in symbol interpretation. In the concluding chapters the author gives an outline of the technique of interpretation. Not all chapters of the "New Development and Technique" are labeled as previous publications but at least four of them were written in 1914 or earlier.

Reading these two volumes of Wilhelm Stekel's dream collection (approximately 30 dreams on 572 pages) results in a feeling of emptiness, superficiality and frustration. This is partly due to the author's way of presenting dreams. At first the dream is reported without introduction, which leaves the reader helpless but expectant. Then the author's interpretation follows and eventually some supporting clinical material. The reader then feels the need to go back to the dream material. The dreams are frequently not related to the dreamer but are often quoted for the sole purpose of illustrating a certain symbol or function and as such they remain hanging in mid-air.

Stekel considers the dream as "an infallible mirror of a sick mind." He furthermore states: "there is not one in the world who is not in some respect sick." This vagueness and incorrectness, while talking about so difficult a subject as dreams, is misleading and annoying. Here, sick mind and unconscious are used as synonyms. Formulations such as these are not found in the works of Freud, towards whom the author assumes a paternizing attitude. While Freud talks about instincts and drives, Stekel talks about "evil" and "the good in man." In the year 1911, when

publishing the book "Die Sprache des Traumes," Stekel wrote: "This work treats of the evil that is in man and of nothing of the evil." Now in 1943, Stekel states: "I should now like to point out that the present book treats of the good that is in man." Both statements are beside the point. The unconscious is neither sick nor good and to call it by such terms shows lack of scientific understanding.

There remains the question: how will the layman and patient react to reading Stekel's dream interpretation? It may be hoped that the lay reader will lose a part of his traditional anxiety concerning any expression of his unconscious. The probability is, however, that the reader will be seduced by Stekel's quick symbol interpretation into a hopeless defensive rationalization. Taking the dream as a kind of crossword puzzle already implies superficiality in the approach. Understanding of a dream cannot be accomplished without placing a dream into the framework of the dreamer's personality.

MARTIN GROTJAHN

BRILL, A. A.: *Freud's Contribution to Psychiatry.* New York, W. W. Norton & Co., 1944, 244 pp. $2.75.

When A. A. Brill, the senior of psychoanalysis in this country, writes a book about Freud and psychiatry, the reader will start with high expectation. Brill recognized psychoanalysis early, started to translate Freud's writings 37 years ago and has participated in every important event of the psychoanalytic movement. He deals, in his book, with very interesting topics as for instance: descriptive and interpretative psychiatry; Breuer's cathartic method; Freud's classification of neuroses; The Zurich School; paranoia and perversions; psychoanalysis, art and religion. The book, however, is not a straightforward autobiography; nor is it a textbook of psychoanalysis. It tries to be both, without penetrating in either direction.

MARTIN GROTJAHN

EVANS, BERGEN (in consultation with MOHR, GEORGE): *The Psychiatry of Robert Burton.* New York, Columbia University Press, 1944, 138 pp. $2.00.

Robert Burton shipwrecked his life upon "the vile rock of melancholy." He wrote his book so that he might "by being busy avoid melancholy." As an inscription for his tombstone, after having died suspiciously and precisely at the predicted day, he chose the famous words: "Known to few, unknown to fewer, here lies Democritus Junior, to whom melancholy gave both, life and death." Bergen Evans and George Mohr have made the man and his book the object of their study. With warmth and respect they have filled the missing link in the human and historical perspective of understanding psychiatry. They have taken an equal interest in the person of Robert Burton and his teaching, relating it to the present state of psychiatry.

MARTIN GROTJAHN

BOOKS RECEIVED

CANTOR, NATHANIEL F.: *Employee Counseling; A New Viewpoint in Industrial Psychology.* New York, McGraw-Hill, 1945, 175 pp. $2.00.

Convalescence and Rehabilitation. New York, Committee on Public Health Relations, New York Academy of Medicine, 1944, 223 pp.

DAVIS, MAXINE: *Women's Medical Problems.* New York, Whittlesey House, 1945, 235 pp. $2.00.

FORD, FRANK R., M. D.: *Diseases of the Nervous System in Infancy, Childhood and Adolescence.* 2nd Edition. Springfield, Ill., C. C. Thomas, 1944, 1094 pp. $12.50.

GOLDEN, ROSS: *Radiologic Examination of the Small Intestine.* Philadelphia, J. B. Lippincott Co., 1945, 220 pp. $6.00.

GRINKER, ROY R.: *Neurology.* 3rd Edition. Springfield, Ill., C. C. Thomas, 1945, 1136 pp. $7.00.

HAMBLEN, E. C.: *Facts for Childless Couples.* Springfield, Ill., C. C. Thomas, 1945, 114 pp. $1.50.

HIRSCHFELD, MAGNUS: *Sexual Anomalies; the Origins, Nature and Treatment of Sexual Disorders.* New York, Emerson Books, 1944, 630 pp. $4.95.

March of Medicine; Lectures to the Laity, 1944. New York, Columbia University Press, 1945, 112 pp. $1.75.

OLMSTEAD, J. M. D.: *Francois Magendie; Pioneer in Experimental Physiology & Scientific Medicine in 19th Century France.* New York, Schuman's, 1944, 290 pp. $5.00.

RICHARDSON, HENRY B.: *Patients Have Families.* New York, The Commonwealth Fund, 1945, 394 pp. $3.00.

RUSSELL, WILLIAM L.: *The New York Hospital.* New York, Columbia University Press, 1945.

SELIGER, R. V. and others: *Alcoholics Are Sick People.* Baltimore, Alcoholism Pubns., 1945, 95 pp. $2.00.

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PSYCHOLOGICAL FACTORS IN COMBAT FATIGUE

With Special Reference to Hostility and the Nightmares *

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The following paper is based upon experience with subacute cases of combat and operational fatigue, seen at a Naval Convalescent Hospital. The other patients in the hospital served as controls. These were, for the most part, men with malaria, arthritis and filariasis. The author's tour of duty at this hospital was too brief for a systematic study of these problems, but it is hoped that the following observations may contribute something toward our understanding of these conditions which are of such great practical and theoretical importance.

I

Neurosis means, generally speaking, inappropriate behavior. It is a matter of degree. Excluding organic conditions, there are no sharp lines between normalcy, neurosis, criminality and psychosis. It is a matter of the degree to which emotional reactions of infancy and childhood influence or dominate, directly or indirectly, mature adult functioning. The normal adult is independent, realistic and reasonable, parental and kindly, remarkably adaptable, and has minimal inner anxiety. The completely normal adult is an ideal, since no one entirely outgrows his long years of childhood to become fully mature. Scratch an adult and one finds a child. In *general* the more adult one is, the more stable and resistant he is to emotional stress, while the more he is dominated by childhood emotional patterns the more vulnerable he is in most cases to such stresses. (See pp. 270-271).

The establishment of disease entities in medicine in the latter part of the last century led to an effort to conceive of mental disorders, both neuroses and psychoses, as disease entities also. Disease entities in medicine meant that bacteria of a certain type affected particular tissues in certain ways, thereby producing typical symptoms and a characteristic course. Lobar pneumonia, for example, or typhoid fever, were such entities. The effort to classify individual mental disorders in the same way did bring increased clarity to the field nosologically. But the functional mental disorders, including all forms of neuroses and psychoses, have proven to be very different from the disease entities of organic medicine. They are not *diseases* at all in this sense of the term or in the usual sense of the term. To think of a normal mind or a diseased mind in the sense of a normal lung or a diseased lung, is naive and incorrect. The *brain* can be diseased in this sense. But the *mind* is a functional concept, and not an organ. It represents the complex reactions of the organism to its environment, determined as it is by its innate potentialities and the conditioning effects of its whole past training and experience. The individual and his mental functioning cannot be fully evaluated apart from his relationship to his environment—his adjustment. As this war has clearly shown, the "normal" person, sustaining terrible and prolonged stress, develops symptoms, such as disturbances in sleeping, eating and bowel-function. Headaches, anxiety and fatigue may develop, even spells of amnesia, and many other and much more severe effects of the strain, even to the extent of psychotic episodes with delusions and hallucinations. Yet a hebephrenic patient who is committed to a mental hospital where he has no responsibilities and few pressures, may adjust to this environment perfectly and be relatively free of symptoms. The same person may be perfectly adjusted in one situation and break down in another. Every person has his own intricate personality make-up and ways of reacting to current pressures, the result, as we have said, of his capacities and his past training and conditioning experiences. He may be conditioned to withstand certain forms of stress, and not others. No one is completely invulnerable or equally resistant to different kinds of stress.

The neuroses of war must be thought of as the results, upon the particular personalities, of the specific

* The views expressed in this paper are those of the author and do not necessarily reflect those of the Navy Department.

The author is indebted to Lt. Comdr. Robert Cohen M.C. (S) U.S.N.R. and Lt. J. G. Delano MC, U.S.N.R. for their help in working out much that is contained in the first section of this paper. This study report was begun jointly while we were both on duty at the same hospital. After being separated, the author proceeded with the general formulations which appear herein, while Lt. Comdr. Cohen continued to develop the clinical and therapeutic aspects of the subject. The two papers are therefore complementary and the reader is referred to his presentation of the clinical material and discussion of therapy in War Medicine, May, 1945.

stresses to which they have been subjected. The combat cases which might properly be called "combat anxiety," develop in reaction to the experience of combat.

For instance:

A man who goes through months of combat, as well as other harrowing experiences, including two weeks adrift on a raft after his ship is sunk, likes it and is eager to return. No "sissy" duties for him, even though he has been wounded. Back in the States for a period, he marries and his wife becomes pregnant. Suddenly he is afraid to die, because of her, although previously he had cared little. He becomes inhibited and anxious and does not see how he can return to the combat area.

Another man, also a hero, was married before the war. He hears that his wife is "stepping out." He has been a hero in combat but now he goes to pieces and makes a suicidal attempt. A 44-year-old Marine cook fought throughout the last war, enlisted in this war in spite of his age, and reacted but little to the prolonged bombing and terrible strain of the first months on Guadalcanal. But when he can no longer feed his men properly and they turn against him, he breaks down. (This case is discussed more fully on p. 259).

A young lieutenant enjoys his experiences and is not feazed by combat, but breaks under the strain of excessive detail and responsibility.

Thus, fear is only *one* of the stresses of war, and attempts to explain all war neuroses on this basis are over-simplifications which ignore a mass of other evidence. While prolonged physical, mental, and emotional strains weaken the resistance generally and increase the susceptibility to the specific stresses which produce the symptoms, there is no sharp dividing line or fundamental difference between the neuroses developed in response to fear and those resulting from any other stress. The "war neuroses" are not an entity or a homogeneous group. They represent the results of all the many strains of life in the Service—combat, danger, the sacrifice of personal freedom, and, in addition, isolation, frustrations of all sorts, separation from home, domestic problems and so on. In the broadest sense, the wife at home with untoward reactions to the stresses caused by war, has a "war neurosis." Even the combat precipitated cases are by no means homogeneous or all caused by fear of the enemy. Often the stress which causes the breakdown is rivalry with a comrade, guilt, or inhibition of aggressiveness. What can be distinguished with certain regularity is that a common response, the fight-flight reaction, is stimulated by a variety of anger and fear provoking situations.

Just as there is no sharp line between all these neuroses, which are not "diseases," but individual ways of reacting to specific stresses, so there is no sharp line between the neuroses of war and those of peace. Some men adjust themselves better to the Service than to civil life, and vice versa. Cases in which there is no difficulty in adjusting to certain environments or stresses grade into those in which the individual can only adjust to certain environments or only to the simplest situations; and these grade into those in which the man's internal make-up is such that his is so inadequate, so in conflict with himself, or so inappropriate in his reactions, that he cannot adjust satisfactorily to any environment. This is the true neurotic personality, but the difference from the normal remains entirely quantitative, for no one, no matter how normal, is in perfect internal harmony, free of tension, and perfectly adjusted to his environment. The normal is *more* stable, *more* adaptable, but he is still a complex, delicately balanced mechanism, and there can be no surety that the most normal man will not develop severe neurotic symptoms if he encounters the wrong kind of stress for his particular make-up. In fact, the surety is that he will. Only he will, in all likelihood, develop only neurotic, not psychotic symptoms.

Man is indeed delicately balanced, and the whole war experience with induction screening as well as with "NP" casualities clearly shows the tremendous amount of neurotic reaction and even of full fledged neurosis in our population. Indeed, neurotic symptoms, that is symptoms arising from difficulties in adjustment, are the rule, rather than the exception. Many of the most effective and successful people are themselves not free of them. With certain exceptions the cause can regularly be traced to disturbances in the emotional development, resulting from unfavorable influences during the earliest years of childhood. That is the critical point for understanding and prevention. It is during this period that the basic personality structure, the accustomed modes of reacting, feeling, functioning, the strong and weak points in the emotional make-up are formed. The quintessence of neurosis, and of functional psychosis, in both children and adults is this: Infantile and childhood attitudes, patterns, and reactions, unduly strong and persistent,—because of emotional influences during childhood which have disturbed normal emotional development—either of themselves, or by conflict with other tendencies in the personality, or because especially mobilized by external circumstances,—generate emotional tensions which disturb normal appropriate thought, feeling, mood, behavior and/or physiological functioning. Disturbance under stress, as during combat, may be normal and appropriate, but its undue persistence after the stress is relieved, may be inappropriate and

hence raise the question of its being neurotic, *i. e.*, motivated by emotional tensions arising from activated childhood patterns and reactions.

In this paper we shall first make a few remarks concerning practical, rather than diagnostic classification of cases. In so doing we shall touch briefly upon some of the stresses to which the men are subjected, but we shall then concentrate our attention on those cases which are precipitated specifically by combat. No final or etiological distinction or classification can be made on the basis of external precipitating factors alone. The essential and broader problem is the precise manner in which stresses and strains of any and all sorts affect the specific mental and emotional functioning of the particular individual and, so far as generalizations can be formulated, all persons. Our discussion is limited to what appears to be a common type of psychological reaction to combat.

II

For practical purposes of treatment and disposition it is important to determine whether a man's symptoms arise from emotional problems which are essentially *internal* and relatively *independent* of Service or other outside conditions, or whether they are predominantly *reactive* to Service conditions or some other *external* situation. These groups grade into each other and many cases are, of course, borderline. In all cases the symptoms result from the reactions of the man to his environment, but in the one group the man's own state is such that he does not adapt well to any usual environment, while in the other group the man is relatively normal and only succumbs because the emotional stress is very severe, or because it strikes the man in his most vulnerable psychological spot. In the service, where extensive therapy is not feasible, the former, the *independent* neuroses, are for the most part dispositional problems.

Most, but not all, men (see page 50-51) who are unable to adapt to the conditions of life in the Service, even apart from combat, without becoming incapacitated, are found to have independent neuroses. They may have gotten along in civil life, often precariously. They have passed the screeners at induction and at the training stations. But for many reasons they cannot tolerate the Service. They may be self-centered persons who cannot sacrifice their personal ambitions and interests for a job to be done; "schizoid" personalities who have lived in relative insolation and are unable to endure close contact with others; over-anxious men; infantile personalities who enlisted for security or to become more masculine; men with too strong homosexual trends; men who are excessively competitive; men with insufficient capacity for independence, responsibilty, and meeting demands upon them. Some men seem relatively normal and capable, but are too individualistic to make the adaptation to life in the Service.

The *reactive* neuroses can be grouped as follows: 1. Non-operational; 2. Operational; 3. Combat.

1. The *non-operational* cases may be service connected or not. As an example of a case not service connected, a young man was too depressed and agitated to carry out his duties. It was found that he had just lost his wife and child.

A service connected case was a young man whose increasing irritability, headaches and fatigue interfered with his work. It was found that he had a passion for things mechanical and despised paper-work, but held a yeoman rating. He said nothing and tried to carry on in good spirits; but his mounting inner frustration and resentment caused his symptoms. Cases of this type grade into the "operational."

2. *Operational:* The emotional tensions and disturbances which are, in the main, reactions to operational service in the war zone, but without actual combat experience, comprise a great variety of conditions. It is of some use in dealing with these men to distinguish between cases in which fear and anxiety are central and those in which they are not.

a. *Non-Anxiety Cases:* One sometimes hears remarks to the effect that all operational fatigues are weak or yellow. This is far from true as shown by the following example. A 44-year-old Marine, developed depression, headaches, fatigue, loss of appetite, constipation, and loss of forty pounds in weight, and was evacuated. It was found that he had had extensive combat experience with the Marines in the last war. In this war he had enlisted and had been a cook. He served on Guadalcanal through the first months. He had very little fear reaction and had unusual endurance in the face of the overwork, little sleep and poor living conditions. He had operated restaurants in civil life, was devoted to his work and had a special pride in serving the best mess possible to the men with what supplies were available. These were adequate until he became dependent upon the Army commissary, when supplies became meagre and the men began to complain seriously. When he was forced to cut sausages in half and serve one and a half to each man, be became guilty and ashamed and felt deeply the sharp kidding and cutting remarks to which he was subjected by the men. The loss of their goodwill and the facing of their resentment was what he, who could tolerate insufficient sleep, overwork, and constant bombing, could *not* stand. He tried to continue but his symptoms finally incapacitated him. Of course, as is usual in these cases, the strains were cumulative and this

final incident was the last straw which precipitated the gradually intensifying symptoms.

Cases of this type very often develop various psychosomatic symptoms, of which the most common seem to be headaches and gastro-intestinal disorders. Some cases of operational fatigue seem to develop because of long periods of inactivity, as well as for a variety of other reasons.

b. *Anxiety Cases:* In these cases, the anxiety results from long periods of vigilance and exposure to danger, without actual combat.

3. *Combat:* A large and rapidly growing literature (6, 11, 12, 4, 9) deals with the complexities of the problem of combat-precipitated neuroses. There is little doubt that the central feature in all these varied cases is *anxiety* and its *control*. In some cases the mere anticipation of danger from a distance is sufficient to precipitate emotional disturbances which sometimes develop even before induction. These *anticipatory* disturbances (which overlap with operational fatigue in classification) are sometimes very severe but, for the most part, only because they activate a latent neurosis. Other men develop symptoms in anicipation, but only just before they enter a combat zone or are about to move up to the front (*pre-combat* cases). Some develop symptoms at the first shot, others only after many months of combat. Sometimes the initial phase of this breakdown in combat is so severe that the men are temporarily psychotic—confused and disoriented, and frequently lose all memory for this period. Cases in the initial stage of breakdown are called *acute* combat neuroses. After such a period most of the men quiet down in a few days or weeks and become post-combat *subacute* cases, so called whether they were severely disturbed at first or not. When the symptoms persist, one deals with chronic cases. In combat many surprises in personality occur. The apparently strong stolid men may break down while the high-strung nervous one becomes calm. The man who has borne neurotic anxiety for many years is often inured to it so that he tolerates danger better than the more "normal" man for whom anxiety is a new experience. One man's neurosis may especially fit him for combat while another man's neurosis incapacitates him. It all depends upon the man's make up. *One central criterion is probably how well his particular emotional make-up tolerates and can adapt to killing, violence and fear.*

The acute combat cases present a wide variety of symptomatology and of clinical pictures. The subacute group shows the same characteristics and through their variety there can be discerned so constant a combination of symptoms that they form an easily recognizable syndrome. This symptom-complex is apparently the same in all branches of the armed forces: anxiety, irritability, startle reaction to sudden noises, insomnia and nightmares. These symptoms are the most constant. In addition there is very frequently increased tendency to sweating and more or less loss of appetite. One soon gets the impression that these symptoms represent the core of combat fatigue. They represent what might be called for descriptive purposes "combat anxiety." This core is the *common feature* in all these cases, and has been described in all branches of the armed forces. It must, therefore, represent a relatively primitive biological reaction. The *differences* between the cases—depressions, paranoid trends, hypomania, alcoholism, hypersexualism, hypochondria, and so on—arise from the reactions of the individual personalities. Each person reacts in his own characteristic fashion to emotional stress, and here the stress is, in general, similar. Some men become anxious, some depressed, some drink, in all varieties and combinations. The point is that in observing the variegated clinical pictures presented by the men with combat fatigue, *it is possible to distinguish the common basic core from differences of reaction caused by differences in personality make-up in each case.*

These nuclear symptoms (anxiety, irritability, startle-reaction, insomnia, nightmares) are readily explainable on a simple basis which also accounts for their uniformity in men of various personalities. It is well known that when danger threatens, man and beast react with *physiological mobilization for fight or flight* (3). The heart beats faster and stronger, breathing deepens, blood is distributed to the muscles,—the whole organism is keyed up to readiness for supreme exertion. And this physiological preparation is essentially the same whether to be used for *fight* or *flight* or other action. It is reflected psychologically in each man's thoughts and emotions. Where the reaction is chiefly fight, the feeling is anger and aggressiveness. Where it is flight or where action is blocked either by external circumstances or internal inhibitions, the feelings are fear and anxiety. The question is why in certain men this psychological reaction, instead of helping performance and then subsiding, bursts its controls and does not fully subside, but persists for long periods. This mobilization for fight or flight makes the man's reactions while in the combat zone intelligible—his belligerency and irritability, his anxiety, his dreams of attacking or being attacked. The average man quiets down, both psychologically and physiologically, after leaving the combat zone. But in some men, the anxiety becomes panic, the belligerency becomes violence, and the man breaks down. The symptoms do not fully subside, but persist in a subacute form which may become chronic. Evidently in these cases the reaction is unusually strong and/or the controls are

unusually weak. The psychological controls may be thought of as comprising both the automatic effects of conditioning, training and conscience, and also the more flexible conscious will which is in part a subdivision of, or at any rate influenced by, these forces.

The *intensity* of a man's emotional response to combat depends upon the strength of his "fight or flight reaction" and upon the strength of his forces of control. And each of these will depend both upon his own emotional make-up, including past sensitizing and conditioning experiences, and upon the external situation. Many external factors influence the fight or flight reaction, such as:

1. Inability to relieve the mobilization by action. This is illustrated in the case of an energetic young volunteer who enjoyed combat duty. When he fought, he "fought like hell" and when he ran, he "he ran like hell." One day, however, an enemy plane overhead was hit and came hurtling to earth, as it seemed, directly at the patient, who was crouched in a watery fox-hole. He could neither fight nor run. His instinctive reaction was to dig but he was stopped by the water. It was at this point, when he felt unable to fight or flee or otherwise *act* as his whole organism was physiologically mobilized to do, that he felt his emotional tension mount to such a degree as to be overwhelming. Apparently if there is a free response in action, whether fight, flight, or other activity, there is much *less* emotion (anger or fear) then if there is *no adequate drainage* in activity of some kind. It is as though the response is dammed up until it bursts its controls and therefore produces a more lasting effect. The plane missed the patient but he found himself in an acute anxiety state. This persisted, together with irritability and belligerency, being ready to fight at the drop of the hat, startle-reaction to airplanes, nightmares of the plane crashing towards him, insomnia and sweating. He had to be evacuated. Because of his irritability and belligerency he had a chip on his shoulder and involved himself in several fistfights and narrowly missed disciplinary action.

This illustrates a most important point. As we have seen, all neurosis is a matter of degree. Every man's belligerency is stimulated in combat. In these cases it is overly strong and persistent. It is a constant part of the clinical picture of combat neurosis. It is essential for treatment, for the sake of the man and the Service to recognize this. Indeed all the usual symptoms—anxiety, depression, alcoholism, paranoid trends, compulsive trends, phobias, as well as many psychosomatic conditions are at least in part reactions to the aroused belligerency and hostility. They are usually ways of handling or escaping these hostile impulses as well as the anxiety. In depressions the man's hostility is turned upon himself, and may even eventuate in suicide. In paranoia it is blamed on others and attributed to them (projection). Probably it is the primary reactive force behind every compulsive symptom. When it is not discharged or when it causes guilt reaction, anxiety develops (as it does from other causes also).

2. Loss of a buddy is another very frequent precipitant of combat anxiety. A man goes through combat experiences for months with only normal fear. Then his buddy is killed and he is overwhelmed with anxiety and develops the typical subacute symptom complex. The reasons for this vary from case to case. There is usually *identification*. The man, like most men, thinks that nothing will really happen to him and protects himself, as we all do to some extent, by a delusion of invulnerability. He identifies himself closely with his buddy who is like part of himself; he has shared many experiences with the buddy and he feels that what the buddy experiences, he can experience also. Now when the buddy is killed, the realization that he can be really killed himself is sometimes so sudden and strong that the anxiety, no longer held in check by the delusion of invulnerability, overwhelms him and precipitates the combat neurosis.

Another reaction to the loss of a buddy is *guilt* which can be severe enough to cause anxiety and depression. In these cases, the man heaps blame upon himself for not somehow taking better care of his buddy, and doing more to save him. He also often has strong guilt because of the strong underlying hostility to the buddy and rivalry with him, and the feeling of satisfaction that it was the buddy and not himself that was killed.* Another factor may be the *sudden loss of emotional support* the buddy provided. Still another reaction is heightened, vengeful *rage*. If within reasonable limits, this can re-enforce morale, but it can be so sudden and so strong as to be everwhelming and threatening to the man's whole conditioning and mental organization. If this mobilization for fight is excessive, it produces the symptoms of combat anxiety. Probably the identification, guilt, rage, and loss of *emotional support*, as well as other reactions, all play a part in these cases, but in different proportions.

3. In many cases the symptoms are precipitated by a near miss, as though this sudden violent threat stimulated so sudden and violent a physiological and emotional reaction that the forces of control were overwhelmed. In some of these cases one has the impression that the physical effect of the concussion acts like alcohol in weakening repression and releasing the anxiety

* Since writing this Grinker has published a pointed example of this reaction: Treatment of War Neurosis J.A.M.A., Vol. 126, No. 3, Sept. 16, 1944, P. 142.

and other symptoms. These cases grade into those in which there is organic damage.

4. A man's adaptability to a situation depends in a large part upon its nature, violence, suddenness and duration.

5. Every person has a certain balance between his physical and emotional requirements and the amount of emotional output of which he is capable. When this balance is too far upset by the demands and frustrations he must endure, he feels himself threatened and reacts with mobilization for fight or flight and often develops symptoms. These symptoms frequently represent a flight back to attitudes and patterns of childhood, that is, are true neurotic symptoms.

How a man stands up depends not only upon the external experiences to which he is subjected, but also upon his make-up, his ability to stand stress in general, and certain experiences in particular. It is said that John Hardin, one of this country's most intrepid and obdurate outlaws, was terrified of an old woman who threatened him with an umbrella.

For convenience of study, three aspects of a man's make-up can be distinguished and each plays a part in his functioning and his resistance to or tendency towards neurosis. There are the animal urges, the "instinctual" drives—sex, hate, love, fear, hunger, and the like. These urges have been controlled, trained and conditioned since early childhood, by the education of parents, schools, and life experience. This results in an automatically functioning set of checks and ideals which interfere with and serve to control our primitive, selfish animal desires, and form, at least in part, what we call "conscience." A third part of the personality is our conscious self, with memory, judgment, will power, and conscious rational control, mediating between our desires, our conscience, and the external world. The following examples will amplify these concepts and illustrate the operation of these forces in producing combat anxiety.

1. *Instinctual Urges:* A powerfully built Marine was somewhat over-aggressive. Neurosis, as has been stressed, is a matter of degree. Because of this quantitative exaggeration of his aggressiveness he might have been considered to have had a tendency or predisposition to neurosis. The source of it was years of mistreatment by a harsh father who administered physical punishment until the patient was adolescent. Unable to retaliate against his father, the patient "took it out" on other boys. Even then he occasionally had some anxiety about controlling himself but he was adequately adjusted and led an essentially normal life. In the Service he became a fierce fighter but on one occasion in battle, after a few months of combat experience, his buddy was killed and he became so enraged that, after fighting like a demon and bayonetting several of the enemy, he felt he could no longer control himself. Thereafter, he developed acute anxiety because of his almost irresistible impulses to attack people, even his own men, and he feared that on the slightest provocation he might let go and seriously injure or even kill someone. Combat now became horrible to him. He was thus incapacitated because of acute anxiety caused by the fear of losing control of his exaggerated hostile murderous impulses. A little quantitative shift in the handling of these impulses can make the difference between a great fighter, an anxiety neurosis, a criminal, and a psychotic paranoid. For these are different reactions to, or outcomes, or modes of handling of, intense, mobilized hostile impulses. This man kept control but was under tremendous tension, became acutely anxious and dreaded even a thought of violence. He feared to sleep because of the nightmares of violence which such hostility usually produces. Of course, the conscience plays an important role in such a case also, as it does in most cases of combat anxiety, but a distinction can be made at least heuristically, from the following examples.

2. *Conscience and Training:* Some men are so trained as youngsters not to vent any hostility that they develop powerful reactions of conscience when their hostile feelings are aroused and it is therefore psychologically impossible for them to be aggressive. They can only react to situations of violence with fear, for they are too guilty and inhibited to be able to attack. When in response to danger, they are mobilized psychophysiologically for fight or flight, all they can act upon is the flight. Often they are so guilty about being aggressive that they are not even able to defend themselves when attacked. Some such men are able to fight for a time, but thereafter become so guilty that they then develop incapacitating anxiety.

For example, a good fighter, a machine gunner, one day killed five of the enemy almost simultaneously. His first reaction was elation—but suddenly he felt that it was wrong to enjoy this and thereupon developed anxiety with some depression, so severe that he was incapacitated.

A young man from a very gentle family was a keen rival of his slightly older brother. He loved the brother and identified closely with him. Nevertheless, there was intense envy of him beneath the surface because of the brother's superiority over him in almost every way. Because he also loved, admired and identified with his brother, his hostility toward him made this man a very guilty person. Moreover, he had been raised very gently and made by his parents to feel guilty about any expression of anger or hostility. He was conditioned by his whole up-bringing to check any

impulse to violence. Hence he came to be able to conceive of violence only in terms of being attacked, never of attacking. Because of his conscience, he was determined to do his duty in spite of his anxieties, but as he approached the combat zone, they became too intense for him to control and he had to be evacuated from the area. He felt bitterly ashamed of his failure. Such a man *experiences* much more intense fear than does the average, for to the *real external danger* is added the full force of the *inner neurotic anxiety,* a fifth column within the man himself.

Anxiety arises from disturbances, not only in the biological drives and the conscience, but also in that part of the personality concerned with will, judgment, etc. (the "ego"). The man who has been overly protected and sheltered and never accustomed to independence of thought and action, the man whose will has been softened by parental domination, the man who is impulse-ridden through faulty training, the man who has been rigidly reared and lacks adaptability—such men are apt to have a difficult time even in civil life, unless fate is very kind to them and provides protected situations in which they can get by. But pushed into the danger of battle, their lack of self-confidence causes heightened anxiety which they are ill-equipped to control. Weakness of will, control and judgment can play two parts in combat anxiety. These can be a primary cause of insecurity and anxiety. And they can cause a failure in controlling anxiety which arises from other sources. Moreover, together with other factors in the personality, they decrease the individual's tolerance for effort, demands, frustrations and deprivations.

Control of Anxiety: Breakdown with combat anxiety depends upon the intensity of the anxiety reaction and upon the strength of the forces of control. The intensity of the anxiety reaction depends upon the internal make-up of the particular man and upon the external experiences to which he is subjected. The forces which tend to support or to break down control of the anxiety can also be divided into the internal and external pressures. This problem, the control of anxiety, is largely a problem of *morale.*

The internal make-up of the man: Two men, exposed to the same danger, do not always feel the same amount of fear. As shown by the preceeding examples their reactions depend upon their make-up. But once fear is felt, the physiological mobilization for fight or flight, with its psychological concomitants, occurs automatically. This can be intense enough to cause symptoms and even complete mental breakdown. We have discussed the factors tending to intensify this reaction. But if two men have reactions of about the same intensity, one may control it, the other not; for some men have sheer strength of *will* and can force themselves to carry on. Some of these men force themselves beyond what they can stand and then break down, not always with anxiety which they manage to control, but with some other symptoms of the strain, often physical, such as gastrointestinal disorders, even stomach ulcers.

Some men are chronic anxiety cases, but they are so accustomed to anxiety that they are used to controlling it automatically; whereas the man who feels it strongly for the first time is often terrified by the experience, loses his self-confidence, and has no well-developed ways of dealing with it. Some men have in greater degree the quality of *adaptability,* and are able to make the transition from civil pursuits to even the toughest duties and to the most harrowing situations.

Other personality qualities also affect the control of anxiety. Most of these can be supported and strengthened by training and indoctrination.

The external factors influencing the control of the anxiety are both personal and impersonal. Impersonal factors are living conditions, food, boredom, duration of the particular tour of duty, and so on. But even the impersonal conditions are often of greatest significance as expressions of personal feelings. The needs for being valued, for being considered, for faith and confidence in the leaders' interest and ability, the demands for fairness and justice, and a feeling for why we are fighting—these are of the essence of morale, of that willingness to go through hell itself for the leader and the group. Fear of the leaders is not satisfactory as a sole basis for morale, as was shown by the German army in the last war. Good morale conditions not only help control the anxiety but also provide a situation in which less develops. It is possible for a man whose morale was of the finest through many months of arduous duty and combat to become demoralized by errors in treatment after turning in, and to lose the *will* to control his troubles and anxiety and to carry on. But if recognized in time, and properly treated, such men can be won back to the will to fight.

Secondary Reactions: Once a man has developed incapacitating symptoms, it is poor therapy to label him "NP" and subject him to neglect, reproach and blame, as though his condition resulted from a deliberate act or choice. The result of such treatment is apt to be a loss of self-respect and self-confidence and a resentment against the Service which shapes an unhealthy attitude. The oppobrium and stigma may deter a few men from giving in to their symptoms, but this is far out-weighed by the demoralizing effects and is

generally ineffective, since a considerable proportion of all casualties are still neuropsychiatric.

The man's conscious choice may play some part in his symptoms—it does not *cause* the symptoms, but it is *secondary* reaction to them. It is usually a measure of the degree to which he feels compelled to give in to his feelings and symptoms. These men are not putting on an act, feigning symptoms or malingering anxiety. Their tolerance for emotional and physical strain has been exceeded and they develop anxiety and other reactions. Most of them have served over a year before breaking. What they could do to conquer their symptoms, most have done, for as well as frustrating the sense of duty, accomplishment, and service, failure or the prospect of it is usually a terrible wound to the personal pride, which is one of the strongest human motivations and hence a powerful lever for therapy. The emotional reaction, the urge to fight or flight, the tendency to anxiety and symptoms, these are automatic and a man can no more be held responsible for them than for his heart-beat or digestion. In the control of the reaction there is a little more flexibility and freedom of choice. Just as in the case of malaria, a wound, or any other condition, the man's total personality may be such that he minimizes the symptom, sometimes even to the point of neglect, that he evaluates it realistically, or that he gives in readily to it or even exaggerates it and tries to exploit it. And even this secondary reaction is not entirely a matter of conscious choice, although this may play some part. In the last analysis it too is a resultant of the emotional forces in the whole personality. The man who carries on in spite of symptoms which he keeps under control, carries a far greater burden than the more normal man. Such cases can be successfully treated, within limits, and often the secondary reaction to the condition is of critical importance in determining the whole course and outcome.

The whole secondary reaction to the symptoms must be distinguished from transient, incidental reactions. Often one sees men with physical injuries, as well as those with emotional disturbances, forget themselves in some situation, such as a hospital party. This does not mean that the symptoms are malingered or "imaginary," but only that the man is well distracted from them. The same thing has been experienced by most of us in athletics. A man is hardly conscious that he has a scratch so long as he is intent on the game—but afterward he finds that he has a painful injury.

A rational program for treatment and prevention can only rest upon understanding. The details and procedures develop from experiment and experience. The basic therapeutic and prophylactic principles can only follow from understanding the problems and must rest upon a firm grasp of human mental and emotional functioning. To avoid confusion, *two* basic aspects of the problem must be kept constantly in mind: (1) The anxiety reaction and (2) Its control. It follows from this analysis that the fundamental principle of prevention and treatment must be: ***to reduce to a minimum the internal and external factors which augment the anxiety reaction and build up those which favor control of that reaction.****

The nature of the combat anxieties as described above can be summarized in outline form as follows:

I. The normal reaction of man as of all animals to danger is physiological mobilization for fight or flight—increased heart action and respiration, flow of blood to the muscles and so on, enabling the individual to perform physical feats under rage and fear, which he is not capable of when calm. In some cases, the psychological effects of this reaction are too intense to be controlled or digested, and either cause breakdown or incapacitation or else merely persist, even when the individual is no longer in danger.

II. The intensity and duration of the reaction is determined by:

A. External circumstances, such as:

1. Being unable to express the excitement or other feelings by fighting, fleeing or other activity.
2. Special experiences, such as loss of buddy.
3. Near misses.
4. Nature, violence, suddeness, duration of the situation.
5. Kind, amount, and duration of demands and frustrations.
6. Other factors.

B. Internal make-up and emotional state of the man. Men already anxious and tense for inner personal reasons, usually have:

1. Primitive instinctual impulses already so strong as to threaten control; e. g. excessively hostile men.
2. Overstrong or neurotic conscience reaction, causing excessive guilt and fear of any hostility.
3. Weakness of will, control, judgment (ego) causing lack of independence, self-reliance, self-confidence, and diminishing tolerance for demands, effort, frustrations, and deprivations.

* States of simple physiological fatigue have not been included in the discussion, but only those in which anxiety was central and which presented the syndrome of anxiety, startle reaction, irritability, insomnia and nightmares.

III. The strength of the man's forces of control and ability to digest the reaction are determined by:

A. External factors—Morale factors.
   1. Impersonal:
      a. Food, shelter, physical hardships, type of duty, boredom, etc.
      b. Training and preparation.
      c. Other factors.
   2. Personal:
      a. Understanding of why we fight.
      b. Leadership—faith in officers, feeling of interest in selves, of being valued, of being appreciated, of being treated with fairness and justice.
      c. Other factors.

B. Internal make-up, such factors as:
   1. Adaptability.
   2. Strong will, control, judgment (strong ego).
   3. Tolerance for anxiety and hostility.
   4. Other factors.

IV. Secondary Reactions:—Once the symptoms begin to develop, then just as with any illness or injury, the men have all kinds of reactions to them—from minimizing them and hiding them, struggling against them, to giving in fully, and even exaggerating and exploiting them.

III

The foregoing analysis of some of the factors in combat anxiety, based upon the subacute cases seen in a Naval Convalescent Hospital, provides preliminary answers to some central questions, and raises a number of others.

Why, as we know from the last war, do symptoms often persist for years after the war is over, even in cases in which there is no question of compensation or any other secondary gain? This is a vital problem. The full answer is not available, so far as I know, but we have already touched upon an answer which, although not entirely proved, is definite enough to warrant elaboration. These combat cases present the same syndrome as do patients who have experienced traumatic emotional shocks in civil life such as the death of a near relative or catastrophes like the Coconut Grove fire in Boston. The published descriptions of the reactions of many of the survivors of this fire correspond exactly with the clinical pictures of the combat anxieties. The experience is too much to be *digested*. More emotional reaction is stirred up than the individual can assimilate or digest (9). And, at least in many cases, once the forces of control are over-whelmed, they never seem to be quite the same again. The forces of control or repression, once broken through by the excessive emotion, seem to be somehow damaged or altered, and this appears in the sometimes severe and sometimes slight but still definite long-lasting changes in personality observable in these men. Common changes are increased irritability, dependence, withdrawal of emotional interest, and so on. This suggests that *emotional trends within the person, which were under control but were powerful and of great importance in shaping the man's personality and emotional life previously, now, once they have been tremendously intensified, and have broken through the weakened, damaged, or altered forces of control, can continue in this new relationship to these controls and so cause the symptoms.*

The man who suffered from excessive rage, stimulated by his father's bullying (p. 19), had controlled his rage all his life to the extent of himself occasionally bullying others and feeling guilty—but after his buddy was killed and he had seen red and let go all controls in killing the enemy, he could no longer control his aggressiveness, even toward his own comrades and even after evacuation he lived in fear of killing or injuring someone. He became anxious, irritable, somewhat withdrawn, and for obvious reasons, his self-confidence was shaken. This seems to me an especially simple, clear, and instructive case. Like Pandora's box or Dr. Jekyll and Mr. Hyde, the hostility, always important in his personality, but relatively under control, now bursts its controls and is free; and the job of returning the bugs to the box or of subjecting this Mr. Hyde to Dr. Jekyll again is no mean task. The previous balance of emotional forces in the personality is altered. The therapeutic task is to correct this disturbed balance.

Other factors also play a part in the persistence of the sypmtoms, for example, the memories of the traumatic experiences, which memories the men so dread; and also the obvious effects of conditioning, as apparent from the specificity of the noises (airplane, shellburst, etc.) which evoke the startle reaction in many cases. But the nature of the war neuroses cannot be grasped, nor such questions as the reason for their persistence answered, without an understanding of *the balance of emotional forces in the personality before the traumatic experiences, and how these have been altered by and after them.*

Comparing the overt clear-cut cases of combat fatigue with controls, one cannot but be impressed by the fact that the differences are for the most part quantitative. Some men who are considered perfectly normal, reveal to a little closer scrutiny, considerable emotional tension, and one or more of the nuclear symptoms of combat fatigue in some degree. The "cooling off" period after combat, before the men are permitted to enter cities on leave, is recognition of

the extent to which all men are stirred up emotionally by battle experience. It is significant that one of the chief reasons, if not *the* chief reason, for the "cooling off" period is that, without it, the men tend to be overly *aggressive* while on leave.

Discussions of combat neuroses have amply emphasized the anxiety which is the presenting and obvious symptoms. Now this anxiety is not a simple unanalyzeable reaction. On the contrary, it is the very essence of the whole problem. It is not merely the fear of injury or death. For not all men react to the same danger with the same kind or amount of fear or anxiety. What a man fears, and how much he fears it, depends upon his own particular make-up. *One of the most important sources of anxiety in war or peace is the status of one's hostile aggressive feelings, especially in relation to one's inhibitions and conscience.* This point is of central importance for the understanding of combat anxiety. Combat means not only danger, but aggression.

The man who is exceedingly guilty about his belligerency cannot indulge it without the automatic fear of retaliation and punishment, which is why some men who have just killed a number of the enemy are at first elated and then become acutely anxious and often depressed, and why so many murderers immediately turn their still bloody weapon against themselves. The man who has been very guilty in civil life, regardless of the reason for it—perhaps from excessive hostile competitiveness toward friends and colleagues, perhaps from cutting corners in his business practices against the dictates of his conscience, or for whatever reasons—these men often live under a vague fear of ill-fortune, which is in reality a fear of punishment, a fear of one's conscience. Such a man sees any danger as a threat to himself. To him battle is apt to mean the fulfillment of the long-dreaded punishment.

In all these cases, instead of the fight or flight reaction being mobilized solely by combat, it has been mobilized to some extent for years by the conditions of the man's life and represents all his resentments and fears, many dating from earliest childhood. The powder charge has long been in place, now the traumatic experiences explode it. The action had been blocked internally by the man's own inhibitions and conscience, rather than by *external* circumstances, as in the case of the man who was trapped in a fox-hole by a falling airplane. Apparently anxiety and other symptoms of combat fatigue occur when the fight-flight reaction is aroused chronically or acutely and its expression in action blocked, whether for external or internal reasons. The internal blocking may be delayed and then appear as a reaction of the conscience. The effects of the internal blocking may only become evident *after* action, as in the case of the man who breaks down because of guilt following free attack upon the enemy.

Fear that has its source in a man's own emotional impulses is called anxiety. If it is severe enough, it becomes "neurotic" anxiety. The important point is that it is experienced as fear, but that its sources lie within the man's own emotions, in his personal relationships, his feelings toward others, and not in the threat of danger by the real external world. It is not an appropriate reaction to the degree of external danger. All men have some hostility which they must control and some reactions of conscience to it, and hence, all men carry a certain amount of inner anxiety. Thus, nightmares occur not only in combat anxieties—they are common in civil life.

This anxiety may be painfully conscious, or it may be pushed aside and denied, or it may be rationalized by attributing it to external circumstances, or it may be over-compensated by daredevil feats, or handled in many other ways. Now, when these men with anxiety from inner sources, face the real external situation of attacking and being attacked, they will react to it in accordance with their own make-ups, especially in accordance with the sources, nature, and mode of handling of their own anxieties. *Combat means violence, and a most important part of a man's make-up for the combat fatigue reaction is the status of his own hostile feelings in relation to his controls, inhibitions, and conscience.*

The better the terms a man is on with his hostile feelings and with his conscience, the less anxiety he carries in life—and probably the less fear does he feel when called upon to kill and to face danger, and the less susceptible he is to combat anxiety. This means the less infantile, neurotic, unjustified, irrational or unconscious hostility a man has, and the more free he is to use his hostility for rational purposes which his conscience accepts, the less anxiety he will have about violence. The army which fights with a clear conscience has a great, though silent, advantage in the long run. The normal man cannot kill for selfish reasons, which his conscience holds as criminal, but is free to kill when it is truly for self-defense and justice. But if the inhibition of a man's hostility is so complete and general that he cannot even fight in defense of home and country, then he, among other types, is a candidate for combat anxiety. At the other end of the scale is the man with too little conscience, who comes to enjoy violence and killing. The comparison of the latter with those who are overly inhibited brings into sharp focus two opposite neurotic outcomes. In the one case, the hostility is indulged. In the other it is rejected but is strong enough to cause symptoms. There are all gradations of cases between these extremes,

(of course many impulses besides hostility cause neurotic symptoms, but in the majority of cases it is an important intermediate reaction). Some men with generalized inhibitions try to fight anyway and thus expose themselves to a situation which stimulates this anxiety, and may result, if they cannot control it sufficiently, in combat anxiety. Other men give in so much to this anxiety (their "egos" are so influenced by it) that they avoid service if possible and some become conscientious objectors on this basis. Such men usually rationalize their behavior by various claims such as that they are not needed, are more valuable elsewhere, or, in the case of the conscientious objectors, on moral grounds. This is a vital problem for emotional education—to train the rising generations to inhibit destructive aggressiveness for selfish, criminal purposes, and yet be free to use it constructively when necessary for self-defense against selfish, criminal aggression. Only such an attitude provides a favorable soil for true morality and lasting peace.

Thus a man's susceptibility to combat fatigue, or to breakdown from any other stress, cannot be gauged on the general basis of "how neurotic" he is—but only on the basis of "what *kind*" of a neurosis he has, that is, what kind of a personality make-up.

Although general factors enter in, emotional vulnerability is a matter of specific conditions. Some men who have histories and even symptoms of neurosis adapt as well as the average to combat, and some men seem to have neuroses which even especially fit them for it. Some top-notch fighting men have problems and peculiarities which fall within any reasonable definition of neurosis. A man may be predisposed to neurotic breakdown in one specific kind of situation and yet be unusually resistant to others. (See, for example, the case of the 44-year-old Marine mentioned on page 258.) The specific relationship of anxiety to violence is perhaps illustrated by the conscientious objectors who volunteered to be infected with the virus of influenza and pneumonia in order to aid the Army in its fight against these diseases (7). Even the fear of death is specific. Some men can face calmly the danger of death from disease but not from human violence.

Will even the strongest, most normal and well balanced man break down emotionally if the strain is great enough and prolonged enough? It seems to the author that the experience of this war answers this fundamental question in the affirmative, but with two qualifications. One is the element of specific vulnerability to certain situations, as though each man has an emotional Achilles heel. The other, is that, judging by the admissions to St. Elizabeth Hospital, according to Lieutenant Commander Zigmond M. Lebensohn (MC) USNR, it is extremely rare for the breakdown to result in lasting psychosis, unless there was clearly a psychotic predisposition.

IV

These emotional dynamics are shown by the typical catastrophic nightmares which are so characteristic a symptom in the combat anxiety syndrome. These have been remarked by practically all current observers, and some believe that they contain the key to the condition. Our discussion of the central role of hostility, inhibitions, conscience-reaction, and anxiety leads directly to these dreams. Anyone who is trained and experienced in the interpretation of dreams knows that they reflect the interplay of emotions in a person in a remarkably direct, unrestrained and graphic way. They are the primitive expression in fantasy form of a person's feelings while he is asleep, off-guard, with his controls weakened. The dreams of every person, varied though they may be, will be found, if compared with those of others, to be highly individual and characteristic, and expressions of the particular person's feelings toward himself, life, work and people. These catastrophic nightmares vary in detail from case to case, but they have in common the fantasy of being attacked and the anxiety. These are their most constant features. Sometimes the man first attacks and then is attacked. Sometimes he is attacked first and then fights in self-defense. Sometimes a buddy is represented as injured and the man is unable to reach him. Sometimes the whole interplay is projected and the dreamer sees others fighting. But the most common feature is the threat to the man himself, or to the buddy with whom he identified, and the anxiety.

Of what is man afraid? The nightmares continue in some cases after all chance of returning to combat has vanished. So this cannot be the reflection of the rational fear of a real external danger. Indeed, some other men sleep through bombings and dream of home and safety. Stranded, starving, endangered explorers have reported dreams of home and lavish dinners. It is well-established that dreams arise from the feelings of the sleeper—from his very strongest and most primitive feelings. If he suffers hardships and hunger, it is quite intelligible that he should dream of safety, comfort and fine food. But what feelings can perpetuate these nightmares after the real danger is past? It follows naturally from the preceding discussion that these feelings are in all likelihood ones which existed in civil life in the man's make-up and which were so mobilized by combat that they overwhelmed or strained the forces of control and thereafter control over them was never fully regained. These excessive emotions cause the irritability, pugnacity, anxiety and startle reaction, and at night the pressure of them prevents relax-

ation, causes insomnia, and finds expression in waking fantasy and in the fantasies of sleep, i.e., in dreams. But these emotions are so intense and so intolerable that the dreams are anxiety dreams. The nightmare quality represents the failure of the forces of control. The content of the dreams is violence, whether directed against others or against the man himself. If now we can approach these dreams exactly like those of civil life, then we can say that this violence which appears in the dream and causes such terror must arise from some violent impulses within the dreamer. We also know that probably the commonest mental mechanism for the control of hostility is projecting it and experiencing it as being directed toward one's self. Persecutory paranoia is the extreme and flagrant form of this, in which the patient, himself filled with hate, feels and believes that he is the innocent victim of imagined persecutors to whom he attributes his own hate. In some instances he hates himself and experiences this as the hatred of others. This psychological mechanism of projecting hostility and turning it against one's self is seen with great frequency in the dreams of neurotics and also of relatively normal persons.

A striking fact, and one which justifies this approach, is that in civilian practice it is common to see essentially that the same syndrome as that of combat fatigue, in men, women, and children who have not experienced great shocks or terrifying episodes at all, but who are under the pressure of too intense hostility. These persons often, perhaps regularly, are tense and irritable, startle easily, frequently cannot tolerate any scenes of violence in moving pictures or books or life, tend to suffer from insomnia, and have anxiety dreams of violence and danger. It is highly probable, therefore, that the cause of the symptoms is the same in the cases of combat anxiety as it is in these anxiety cases in civil life; only in combat cases the external provocation is usually vastly greater and tremendous external stimuli, often over long periods, act to mobilize the emotions and to precipitate the symptoms which in most cases might not otherwise have appeared. That is, the combat fatigue symptoms are usually more *reactive* to the external circumstances than are the anxiety states of civil life. It is for this reason that the term "combat fatigue" was introduced—to distinguish these reactive conditions from lifelong independent neuroses.

The basic emotion which underlies the symptoms in all these cases is the force of the individual's own hostility; or, possibly, most generally, his arousal to fight or flight which probably occurs in some degree in reaction to any threat, frustration, or irritation. As already indicated, the details vary from case to case, but the main results are closely similar. How does this affect the dreams? We have said that if a man has been long intimidated against any expression of belligerency, then it is common to find that when this is aroused in him, it is experienced only as fear—he can flee when aroused, but not fight. Now such a man cannot even dream of freely attacking—his rage and hate are always inhibited, and he dreams of *being* attacked by others. If a man has been freely aggressive against the enemy but then fears that he will lose control of his aggressiveness and even attack his own men, he struggles to inhibit his combativeness, feels anxious and guilty about it, and in his dreams cannot relinquish control of the hostility, but must experience it as directed against himself or in some other distressing form.

Until proven otherwise, it must be assumed that the violence in the dreams of all these men in whatever form it appears, and however directed, is the violence of the man himself. In the cases in which there is obvious strong guilt, where the violence to the self comes from the powerful reaction of a guilty conscience, it is easy to see that the man will feel it and experience it in his dreams as directed against himself. (Presumably projection and turning against the self is caused, at least in part, by the conscience.) Such a severe conscience reaction usually originates in the man's own rage and hate; it is about these feelings, whether acted out or not, that the man usually feels most guilty—that is, the conscience reaction itself usually has its source in the hostility and is an intermediate step in producing the anxiety. It may result from hostile feelings in civil life, long before combat—and may only be aroused after the man has killed many of the enemy. For a man to dream of danger, either meeting it or escaping from it, when he anticipates battle, is easily intelligible. We are discussing only the nightmares which persist long after all danger is past. Control studies of the dreams of other groups of men before and after battle, after evacuation, for other reasons, as well as in other circumstances, would be most helpful and illuminating.

Because the nightmares are usually about some real horror that was experienced, most often about the precipitating experience, it may be that some other element enters into its causation such as a sort of fixation because of the effect of this final stimulus. But one can go a long way toward explaining these anxiety dreams without recourse to such a theory. That this scene or a closely related one was the great shock or the last straw which mobilized the long accumulating emotions sufficiently to crack the controls, makes intelligible the choice of the particular scene in the recurrent nightmare even without other factors, although

they may be present. In civilian experience the appearance of real scenes in dreams is regularly found to serve as a convenient disguise for the patient's own unacceptable, rejected emotions—"it is not my fantasy, my creation," the patient says in effect, "but only external reality." But why does he dream of just that particular bit of reality? Always for good emotional reasons—to attribute to external reality something that is within himself.

It is always easy to project the violence on to the enemy, but if one watches closely, one often sees the man give away the fact that it is his own. Thus, one man, during combat, lost his head and attacked the dead body of one of the enemy with his bayonet. After that, he became violent and suffered from impulses to attack his own men with his bayonet. But he had a severe startle reaction with terrible anxiety that one of the enemy was approaching to bayonet *him*, and he dreamed of the enemy coming at him with bayonets. He became dangerously violent and had to be temporarily incarcerated. His hostility was so great that, in reality, he tried to bayonet his own men, but he *dreamed* of the *enemy bayoneting him*. He thus projected his violence on to the enemy and turned it against himself in his struggle to regain control of it and not have it come out against his own men. The whole problem requires much further study but certainly hostility and guilt as well as anxiety play fundamental parts in combat fatigue. Only the hostility and the guilt may not be obvious and on the surface. *They may be hidden and long repressed, and not recognized by the man himself, and only appear in the form of the symptoms.* Literature, drama, and even the cinema abound in examples of guilt and anxiety reactions which occur after deeds which the person never thought would so arouse his conscience ("Macbeth", "Markheim", "The Informer", and other familiar pieces). A most instructive illustration appears in a short story by Bruno Frank called "The Golden Beetle." The author describes a prison warden who for long years had been sadistic in subtle ways toward his charges. One day he is almost killed by one of them out of revenge. This mobilizes an overwhelming conscience reaction, which is manifest in the typical symptoms of combat anxiety—anxiety, startle reaction, insomnia, nightmares, irritibility, loss of confidence, increased withdrawal and dependence.

That there should be a close relationship between such opposite tendencies as hostility and anxiety, attacking and being attacked, as seen in the behavior, symptoms and psychology of these men, is not surprising if one remembers that it is chiefly the direction of the impulses which is opposite; that our training against aggression tends to change this direction and that the emergency physiological mobilization of the body serves for either fight or flight and readily takes either form; and that this is the primitive basis of the combat fatigue syndrome which sets in motion the more subtle and more individual psychological reactions of the higher levels.

Following the last war Freud pointed out that the nightmares following catastrophic experiences, such as battle dreams following combat, are apparently caused, like the traumatic neuroses, by the mind's inability to master an overwhelming rush of stimuli (9). This would be seen, for example, where an intense fight-flight reaction is stimulated but cannot be relieved in action. The part played by this failure to master the emotional situation and the subsequent attempts to do so has been developed by others, particularly Kardiner (8) and Rado (10). Apparently the individual continues to struggle to master the excessive emotions, and his failure to do this is reflected in the symptoms, and, during sleep, in the nightmares. From this viewpoint the hostility and guilt would function primarily in the rôle of being released and so causing the excessive emotions which overwhelm the individual and which he struggles to master. Their role appears in the fact that those battle dreams never, in my experiences, report the battle scene exactly. If one presses the patient for a precise description of the dream one finds certain deviations from the reality. Usually the dream is *worse* then the reality—the patient is injured or killed instead of being unscathed as in reality, more of his shipmates are killed, and so on. This deviation is the clue to the patient's personal reactions and problems.

It must not be forgotten that not every man breaks down with anxiety and nightmares. Some seem to react but little, others violently but only temporarily, others become aggressive rather than anxious, while others develop guilt, and still other reactions are seen. To explain the condition and the nightmares we must take cognizance not only of the ego's struggle to master the overwhelming emotions, but also of the reasons why these emotions differ in quality and intensity in different men. In seeing these men it is difficult to understand the *persistence* for months and years of these emotional states, except in terms of a release of instinctual impulses and/or of conscience reactions, which the man struggles to master. In other words, it is not only a matter of how much the ego can stand and digest, but of what powerful emotions are aroused and threaten the ego and therefore stimulate its needs to master them.

V

Our discussion has been focussed upon those cases in which actual combat, experienced or anticipated, has

played a central role in the symptoms. But it is applicable to a considerable extent to cases of "operational fatigue," into which the cases of "combat fatigue" grade. Operational service in which danger is great is obviously closely related to combat experience for many men.

One also sometimes sees a clinical picture resembling combat fatigue in men who have been subjected to severe operational stress, even without danger. The author's series of these cases is too small to warrant general conclusions, but a few remarks are justified. The nuclear symptoms are sometimes similar, but the nightmares and startle are usually much less prominent. For example, a young officer had begun active duty before he was twenty. Because of his ability he advanced quickly to positions of responsibility, in spite of his youth. He was soon in command of a squadron of PT boats and thereafter became executive officer of a destroyer. He enjoyed the sea duty and had little anxiety about the dangers. These he could tolerate very well. But after nearly four years of sea duty, with constant responsibilities and demands the putting of ships into commission, going out with green crews, and innumerable other details, he began to feel the strain. The demands upon him were commensurate with his ability but exceeded his emotional means. He became irritable and acutely anxious, and began having violent temper outbursts, crying spells, and suffering from insomnia with increasingly frequent nightmares. Finally he developed spells of amnesia, in which he would find himself at some part of the ship with no memory of how or why or when he came there. Although anxiety was a prominent symptom in this case, it did not arise from this young man's reaction to danger, but from demands upon him so severe, constant and prolonged that they exceeded his emotional capacity to meet them. The most obvious emotion behind his symptoms was a mounting rage against the continual demands upon him which put him, so to say, too far into the psychophysiological red. This is a most important and fundamental reaction. It is central in many cases of combat anxiety and also of civilian neuroses. It illustrates the fact that every individual has a sort of emotional metabolism, a balance between emotional indulgences or intake, and emotional output.

The foetus is so dependant as to be parasitic. The growing child must still be cared for but gradually becomes increasingly independent, giving and able to take increasing responsibilities. With growth to maturity the balance changes—the helpless, parasitic infant matures into the responsible parent. The stronger and more mature the adult, the more he can give of attention and emotion, of physical and mental effort toward responsible, productive ends, and the less he has of the childhood needs for emotional support from others for love, leisure, play, self-indulgence, escapes, and so on. But everyone has limits in the balance between his emotional anabolism and catabolism. When the deprivations and frustrations of his emotional needs combine with excessive and prolonged demands upon him, at some point his output so far exceeds his intake that this equilibrium is unbalanced and symptoms begin to develop. The young officer used here as an example, was certainly as strong as the average, and perhaps considerably more mature than most young men of his years. As in so many cases, the wonder often is how the man bore up as well as he did. Thus it appears that even the strongest and best balanced men break if the strain is great enough. And one of the most important types of strain is this unbalancing of the relationship between the emotional indulgence and the emotional output. This can cause frank neurotic symptoms of all sorts, in this case, among other symptoms, true amnestic fugues which were automatic, unconscious, uncontrollable withdrawals. It underlies the symptoms in many of the combat cases, and plays some part in most neuroses.

The example of the young officer shows too that exposure to killing and being killed is only one of the strains which can break down even normal men to the development of neurotic symptoms, and that operational and combat cases grade into each other. The underlying dynamics are similar in many instances in that, as seen in this example, there is a mounting inner rage as the individual feels his emotional metabolism being unbalanced, an increasing rage at the deprivations and the demands; that is, a mobilization of the fight or flight reaction as a response, in self-defense, to this threat to the equilibrium of the organism—a chronic, gradual, vague threat, rather than the acute threat of enemy action. This example also shows that some men can stand the acute danger of battle far better than chronic demands and frustrations. In every case this factor must be evaluated as well as the specific effects of actual combat experience.

Another man with a similar type of symptom was an officer who had never been beyond the continental limits. He had devoted himself unflaggingly to supervising construction in a job with limitless details, delays and frustrations. In this case, feelings of depression were prominent. Here too, rage was central—resulting from an inner rebellion and defense against demands which exceeded his emotional and physical energies. Hate of the enemy provides a certain safeguard, by draining the rage, so that it does not come out in other directions, in irritability and resentment

toward others or toward one's self, either subtly or as depressions, or even in the extreme form of suicide.

But in some cases of operational fatigue, other feelings than rage seem to be central. A man of very high calibre found himself on a relatively large ship of a particular type, with a crew which, for certain good and sufficient reasons, was more than usually rough and ready. This man in civil life held a very responsible position, was very devoted to his family, and was very conscientious and productive. The duty on this ship was light and safe. But it did not provide much for his talents and energies to come to grips with, and he felt very much alone among this particular crew. As months passed and tensions mounted, the other men relieved theirs by drinking freely and finding women when in port. But this man was unable or unwilling to let himself go in these or similar ways. He yearned for his family and for creative work and simply could not relax his standards of functioning. He developed stomach pains and, eventually, a duodenal ulcer. Thus, his less conscientious, more happy-go-lucky, and, by certain standards less mature, shipmates, willing to indulge their own pleasures with little further thought, adjusted better than he. He could not relax his level of personality operation, and was, paradoxically, too devoted to accomplishment. When his mature pleasures in responsible, productive work, and in devotion to his family were curtailed, he could not accept the more playful, self-centered outlets. Yet he was no prude. Such a case, not a rare one, is instructive of the complexities of adjustment to the Service, and shows how little validity most generalizations have. Here some of the weak brothers adjusted to this duty better than this relatively strong, high calibre, stable personality. And occasionally one sees an officer who develops sufficient tension to produce symptoms of one kind or another in the course of fighting for his standards of accomplishment and performance—while the man who drifts along remains better adjusted.

Combat fatigue does seem to show certain differences from the neuroses of civil life. A few have been mentioned and may be summarized at this point. The nucleus is probably most similar to the anxiety states. The combat fatigues are more reactive to the enormous stresses which mobilize emotions and weaken controls far more than is usual in civil life. The subacute and chronic anxiety neuroses of civil life are also frequently precipitated by emotional shocks, but more often they are the results of the individual's accustomed attitudes and functioning while the combat fatigues result from exposure to, or the anticipation of real violence of a degree, intensity and duration rarely encountered in civil life. And the defenses and controls are interfered with in many ways by the demands and exigencies of the Service far more than in civil life where a man is freer to deal as he wishes with his personal problems. And possibly there is a qualitative difference also, if there is any kind of damage or alteration to the man's forces of control, so that he cannot return completely to his former control of and relationship to his emotional impulses. This is, of course, seen in civil life also, in those cases in which there is a considerable breakdown of the repressions, but it is not seen nearly so frequently in the average run of neuroses. It would seem then that there are differences but that these differences resolve themselves into essentially quantitative and statistical ones.

The greatest single feature which distinguishes civilized man from savages and the lower animals is his control of his hostile impulses, especially those toward his fellows. Arts and manners are hollow frills if brutality and murder are permitted to flourish. This country represents a high degree of civilization. Our people live in relative peace with each other and with other nations. We are trained from birth to control our hostile impulses and to devote our energies to constructive activities, and not to brutality and conquest. Double credit goes to our men, who, trained for years to peace, can make the adaptation to war and become fierce fighters for that peace. But it is not surprising that some of our young men, trained to civilization and personal freedom, find difficulty in adapting to the rigors of military life and discipline, and to the carnage of battle. It follows that the appropriate attitude to take toward them is to do all that is possible to help them to make this temporary adaptation to the demands of this war against aggression, and then to help them to make the adaptation back to peaceful civilization; to understand and restore to emotional health and usefulness and self-respect those men who have failed to make the adaptation to violence or broken down in trying to do so. Success in these directions will depend upon the achievement of thorough understanding of the emotional psychology of the condition. Paradoxically, perhaps, many of these men are victims of something which we value highly—the *conscience,* which, however, "doth make cowards of us all." The converse may also be a problem—those men whose aggressions have been so released that they will have difficulty in controlling them when they return to civil life. This, as well as combat anxiety, brings us face to face with the problems of man's hostility to his fellows, which is certainly the greatest source of human suffering and the most important problem facing mankind today.

SUMMARY

The combat fatigue syndrome of anxiety, irritability, startle, insomnia and nightmares represents a common nucleus which can be distinguished from the innumer-

able individual differences of reaction which result from the individual differences in the personalities. This common nucleus is the emergency physiological mobilization for fight or flight with its psychological concomitants. This produces persisting symptoms rather than merely aiding fight or flight when it becomes intense enough to upset the man's psychological equilibrium of emotional forces.

The intensity of the reaction depends upon the external precipitating circumstances—nature, duration, suddenness, opportunity for action, etc., and upon the internal make-up of the man—intensity of his hostility, severity of his conscience and inhibitions, toleration for effort, demands and deprivations.

The control of the reaction depends upon external factors—living conditions, boredom, training, understanding of war goals, confidence in officers, feelings of being valued and treated fairly, etc., and upon internal factors such as the man's adaptability, strength of will, tolerance for hostility and anxiety.

Once symptoms appear, secondary reactions to them develop—minimizing the symptoms, struggling to control the giving in to them, exploiting them and so on. This secondary reaction must be clearly distinguished from the *causes* of the symptoms. The essence of the combat fatigue syndrome is that the man's experiences stimulate and mobilize emotions which have always been important in the personality, and which overwhelm and strain his forces of control. He is then unable to digest these experiences: *i.e.*, regain control of the emotions which have been aroused by them. Chief among these emotions is hostility and violence. In seeking to control the hostility the commonest mechanism is to project it and turn it against the self, *i.e.*, experience the impulse to fight and attack as being attacked. The conscience is generally of importance in this.

This view of the dynamics of combat fatigue bases the clinical picture upon the physiological mobilization for fight or flight, explains the symptoms, including the catastrophic anxiety dreams, and shows the relationship of the condition to the anxiety states of civil life, from which they differ chiefly in the intensity of the precipitating experiences which stimulate emotions which might otherwise have remained under control.

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REPORT ON POST-WAR GERMANY

During the spring of 1944, a series of seven conferences was held by the Joint Committee on Post-War planning, of which the American Society for Research in Psychosomatic Problems is a member, to study and discuss the problem of post-war Germany.

An abstract of these proceedings may now be obtained from Dr. Richard Brickner, 1000 Park Avenue, New York 28, New York.

AN HYPNOTIC ABLATION TECHNIQUE FOR THE STUDY OF PERSONALITY DEVELOPMENT *

A Preliminary Report

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INTRODUCTION

The phenomena of hypnotic regression have been known for well over 50 years, from the earliest psychiatric investigations into hypnotic abreaction. The induced regressed states have been employed for three general purposes: the cathartic recall of unconscious trauma, the gathering of life history data, and the direct suggestion of symptom-disappearance (1). Erickson reports (2) refinements in hypnotic technique which "place" the subject at arbitrarily suggested periods in his life history; the striking innovation is the apparent freedom of the hypnotist to select carefully specified points in life history, and then to stimulate and evoke behavior clinically authentic to the period selected, not merely reports of or associations to trauma. This freedom was our experimental vantage point, with independent developments in technique. We wished to make a systematic investigation into the precise character of these controlled hypnotic-regressed states. The subject was tested at each of a planned sequence of regressed age levels by means of a consistent set of standardized psychological instruments and other clinical procedures usually employed for evaluating the behavior qualities, intellectual processes and personality factors of the normal, awake individual. A brief report of our method and a sample of our data follows.

The senior author (H. S.) began his studies into this type of hypnotic phenomena during an exploration of the easy regressibility of an hysterical patient under his care (March, 1942). For this first case the following instruments were utilized: revised Stanford-Binet Intelligence tests and Koh's Block Performance tests (with S. Fishman), Rorschach tests (with I. V. Kendig, Ph.D.), conditioned reflex studies (with W. H. Gantt, M.D.), and electro-encephalographs (with R. Cohn, M.D.). Subsequently, a second patient, with hysterical amnesia, was subjected to more thorough study with refinements in method and control. For this second case, nine clinical psychological tests were employed (with J. Shor): drawing of a man and woman, Bender Gestalt drawings, Rorschach tests, Thematic Apperception tests, Revised Beta Intelligence tests, Koh's Block Design tests, Binet Vocabulary test, Tendler Projection Sheets and Shor Completion Blanks. Also, electro-encephalographs were taken (with J. L. O'Leary, Major, M.C.). Further studies are in process and a complete account is in preparation. Here we shall report some of the Stanford-Binet data in our first case, the case of N.

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The material of this paper constitutes a part of a presentation at the annual meeting of the American Psychopathological Association at New York on June 9, 1944.

HYPNOTIC ABLATION TECHNIQUE

The subject was hypnotized through visual fixation, in the usual manner. The depth of the hypnotic state and his responsiveness were then tested with sensory and motor suggestions (*e.g.*, areas of anesthesia, hands "glued together," arm paralysis). These responses were induced at the beginning of each hypnotic session, but for less than five minutes. After three such usual non-regressing hypnotic periods, the subject was disoriented from present time-space, and gradual regression to specified age levels was suggested. These suggestions were continued for less than one minute. The following is a verbatim example of the hypnotist's regression stimuli:

Hypnotist: "This is no longer the present time. You are going back into the years. You are getting younger and younger. You're twenty-four years old, twenty-three, twenty-one, nineteen, sixteen, ten, eight, seven years old. Today is your seventh birthday. Today you are seven years old. This is your seventh birthday. When I touch the side of your head you will be able to open your eyes. You will meet a friend whom you have never seen before; his name is George. He will have something interesting to show you. All right, now you can open your eyes. N., meet George."

The Friend: "Hello, N. How are you? (Responses noted.) Anything special today? Oh, your birthday! That's fine. Happy birthday. How old are you? What is today's date? And what day of the week is it? Anything special going on today? All right, now I have some interesting tests to show you. (Then follows a fully standardized administration of the psychological test.) That was very good, N. You did very well. Goodbye."

Hypnotist: "Now N., when I touch your forehead, your eyes will close again. Now you are getting older. You're eight years old, ten, thirteen, sixteen, nineteen, twenty-two,

twenty-four, twenty-five years old. It is . . . . (current date). You are at . . . . (actual place). When you awake you will have no memory for anything that happened during this interview. You will feel refreshed and have no pains or discomfort. I will count three and you will awake."

Certain features of this standardized hypnotic-regression procedure may require explanation and justification. The most fundamental feature is the focus on the birthday, for the following reasons: (1) The birthday is a precise, objectively definable day, without the ambiguity of any simple suggestion as that "you are now seven years old." (2) The birthday is usually of some emotional significance. We found that hypnotic regression has, in general, been more easily obtained for emotionally significant days or occasions. (3) There was thus no immediate necessity to unearth other special days. (4) The comparison of the behavior functions manifested at the various age levels yields systematic correlations and growth curves at standardized chronological points in life history.

In our procedure, direct suggestion about the character or quality of the regressed state is at a relative minimum. The subject is simply "placed" at the specified birthday. He is not pressed to arbitrary moods or special emotional states. He orients himself and is permitted to express a spontaneous, self-selected perspective or *Weltanschauung*. The "friend" asks for his orientation and may carry him along with non-suggestive neutral questioning for three to five minutes, allowing the subject to express his spontaneous feelings and associations. The subject may specify the moment of the day as concretely as, and in whatever manner he wishes. Many theoretical issues might be raised here concerning the nature of the hypnotic relationship and of the regression. We feel that the specific suggestion procedure outlined here may be varied for special experimental purposes. The resulting data might clarify special aspects of either the hypnotic relationship or the subject's personality (3).

The rôle of the "friend" is another crucial consideration. In order to limit the possible libidinal interaction of the hypnotist and subject during the latter's functioning on the objective tests, a relatively neutral third person was introduced. Early in these studies, the hypnotist felt that without a third person special emotional factors were distorting the subject's spontaneous responses to the test stimuli. In our second case, R., tests of this hypothesis confirmed this impression. The full report will present the complete data. Insofar as the hypnotist plays the rôle of a substitute parent figure (3), the "friend" becomes a relatively neutral figure in the regressed world.

Other significant aspects of the hypnotic procedure are the use of the opening and closing of the eyes to bound the regression period, the suggestion of amnesia for the entire regression experience, and the re-orientation to current time—place.

We suggest that the net effect of this procedure is an authentic regression to the total quality of the personality, both with respect to intelligence and emotions, which was natural to that subject at the specified age level. He makes efforts to respond and to perform to the best of his ability, utilizing only the learning and growth which had been available to him at that time. He appears to have no access to memories, experiences, and capacities which he had acquired in life later than the suggested age levels. Thus, there appears to be a more or less complete blocking out, or *ablation* of all functional qualities from the present back to the specified birthday. Much as the experimental neurologist ablates higher nerve centers and thus releases behavior qualities and activities of a lower neural level, this technique of hypnotic ablation may be said to release those earlier personality—intelligence manifestations, which ordinarily are buried or disguised as the personality grows and develops in complexity through the impact of more recent life experience. The hypnotic ablation is controllable and remediable, but it appears to be sufficient to permit authentic expression of earlier life stages. There is no doubt that special suggestions and other variables in procedure may disrupt and distort such natural expressions. These data are themselves significant. However, we wish first to explore the full range of authentic personality regression.[1]

We have listed certain experimental variables in hypnotic procedure, some of which have been tested in our studies to date. These and other variables invite more intensive exploration.

SAMPLE OF CLINICAL MATERIAL: STANFORD BINET TESTING IN THE CASE OF N.

The Stanford revision of the Binet scale remains our most widely standardized test of general intelligence for use with children. The norms are relatively more adequate for school children from six to fourteen years of age (5).

The test yields a total mental age (M.A) and an intelligence quotient (I.Q.). These gross measures have recently been subject to critical re-evaluation, because of accumulating evidence that cultural and motivational forces influence intellectual functioning.

[1] The concept of regression may occasion much ambiguity and confusion unless carefully applied. For example, it will be necessary to differentiate historical from topological regression. The more general concept of ablation and release may better suit our purposes, until the experimental data can be gathered and studied more carefully.

Accepting the proposition that intelligence always grows through and functions for a specifically developed personality orientation (4), we shall consider the M.A. and I.Q. scores as rough indications of the general adaptability of the individual to an hypothetically normal cultural milieu. Growth curves for mental age, as derived from the Binet test, correlate significantly with the total process of personality development. Therefore, N.'s M.A. and I.Q. scores will be presented in spite of the fact that gross M.A.-I.Q. scores are now viewed critically.

N. was first given the Binet in his normal, awake state (age 23 years, 5 months). In the subsequent three weeks, the test was administered during twelve separate hypnotic-regressed states. At this early point in our experiments, the regressed age levels were selected somewhat arbitrarily, without the controls which we later employed.

First, an absolute basal year was sought, a regressed level at which he would not score on the lowest level of the Binet scale (the 2-year level). N. was regressed to his second birthday and tested. However, he scored, getting an M.A. of two years, nine months, with a scatter, through the fifth year level. He was regressed to his first birthday, but could not establish any contact with the test materials. He was therefore returned to the "one and a half year" level. Although this stimulus lacks the specificity of a birthday, it appeared to be effective. He looked at the picture of a hand, turned to his own hand, but did not name it, as requested. He followed the pointing finger to the play objects, picked up the doll and strongly resisted giving it up. Yet, he failed to score any credits on the lowest test level. He appeared to be unable to comprehend any directions and apparently could not accept the test situation.

Having established our absolute basal at below two years of hypnotic age, we decided upon a three year interval between regressed age levels. He was regressed in the following sequence: 5th birthday, 8th, 11th, 14th, 17th, and 20th. This procedure offered a partial control; he could not acquire familiarity with most of the test stimuli he would face at each next level, since the test material changes considerably every two or three years. However, the results indicated a need for additional testing, for certain experimental purposes.

The test scores showed a relatively poor performance at the 5 year level (I.Q. 95) and also a somewhat low performance at 11 years (I.Q. 111), low especially in the light of his I.Q. of 129 at 14 years. To test at nearby levels, he was regressed to his 4th, 12th, then 6th birthday. Also, since N. moved from a rural to an urban environment during his fifth year in order to attend public school, he was regressed to "the first day you began school" (age 5 years, 9 months). It was felt that a Binet test at this point might reveal his capacities just before his first formal educational influence. Table I summarizes the data obtained at the regressed age levels and the sequence of testing. The somewhat random order of age levels tested offers a partial control of learning or estimating aids.

TABLE I

HYPNOTIC AGE LEVELS OF BINET TESTING

Age level	Order of testing
23 years, 5 months (awake)	1st
1 year, 6 months	3rd
2 years	2nd
4 years	10th
5 years	4th
5 years, 9 months	13th
6 years	12th
8 years	5th
11 years	6th
12 years	11th
14 years	7th
17 years	8th
20 years	9th

BINET TEST SCORES AND SOME IMPLICATIONS

Table II presents the scores obtained on the thirteen administrations of the Stanford Binet (Form L) at the specified regressed age levels. The mental age data represents a fairly typical normal intellectual growth curve. The I.Q. values in Table II show a relative constancy. Some apparent discrepancies may be examined in terms of factors residing in the construction and standardization of the Binet test. Life history data will be given to explain other trends in his growth curve.

TABLE II

BINET TEST SCORES UNDER HYPNOTIC ABLATION

Hypnotic age level	Binet M.A.	Binet I.Q.
1 year, 6 months	No score (Basal)	No score
2 years	2 years, 7 mo.	129
4 years	4 years, 0 mo.	100
5 years	4 years, 9 mo.	95
5 years, 9 months	6 years, 5 mo.	112
6 years	7 years, 10 mo.	131
8 years	9 years, 4 mo.	117
11 years	12 years, 10 mo.	117
12 years	13 years, 4 mo.	111
14 years	17 years, 8 mo.	129
17 years	17 years, 10 mo.	119
20 years	20 years, 2 mo.	134
23 years, 5 months (awake)	18 years, 5 mo.	123

The early and late years show a relative unevenness in I.Q. level. Stanford-Binet norms begin at two years but have less accuracy below school age. Also, 16 years is the highest age for which any norms are given; ages above 16 are computed as chronological ages of 16. The test is acknowledged to be less discriminating at these limits (5).

His drop in I.Q. from 129 to 100 and then to 95 (from ages 2 to ages 4 and 5) may be related to the relative barrenness of his rural environment. This superior child found insufficient stimulation to develop his capacities. Also, he was frequently ill during that year. After moving to a city early in his fifth year, he shows a quick rise to an I.Q. of 112 in a few months (at C.A.[2] 5 years 9 months). Then there occurs a sudden leap in three months from a mental age of 6 years 5 months to an M.A. of 7 years 10 months. Despite the possible flowering of his superior capacities under school stimulation, this 17 month jump in mental age seemed unreasonable.

The subject was therefore regressed to his 6th birthday once again and tested below his basal year of five to explore his sub-basal functioning. He showed a consistent inferiority *only* in tests of picture vocabulary and visual imagery, at *all* lower levels. He thus lowered his M.A. score to 7 years 2 months and his I.Q. score to 119, providing a more reasonable jump from the previous level.

The consistency of the type of relative inadequacy in his intellectual development revealed in this sub-basal testing, offers a clue to a significant diagnostic personality trend—a preference for less immediate stimulus challenge and for more abstract processes. Evidence for this personality factor, this wish to avoid a close, rigid awareness of immediate, concrete, and sensory reality pressures, is to be found in his diagnostic psychometric pattern at higher levels, including his awake performance, in his Rorschach data, and in the hysterical illness which caused his hospitalization at the age of 23. Thus, it is suggested that these data may indicate *his* patterns of intellectual functioning when *he* was the specified age, and not merely his estimations of the intellectual functioning appropriate to *any* normal or superior child of that age.

The objection may be raised that the subject might consciously simulate the appropriate psychological functioning at these earlier age levels. To test this possibility, N. was asked a random series of Binet questions, and was told to respond "as if you were five years old"; then "as if you were eight years old." His responses showed many wide deviations from the appropriate levels. N. expressed much confusion and resistance to this task of estimating "as if," claiming he was *unable* to conceive of the capacity level of a child of 5, or 8, or of any such earlier ages. He indicated that he felt the request to be pointless and unreasonable. He had complete amnesia for his previous successful performances when regressed under hypnosis, *i.e.*, his, perhaps, unconscious estimations at twelve regressed age levels.

The regressed states as manifested in the test data are thus not abstract, intellectual estimations, but seem rather to be authentic early experiences, somehow recaptured, re-awakened, or released through the hypnotic ablation procedure. It is possible that the induced recall may be guided by an emotionalized estimation, peculiar to his adult personality, of his own earlier attitudes and abilities. Alternatively, the induced recall may be guided by an emotionalized record or estimation of his earlier attitudes and abilities, which he had integrated in the course of his personality development.

In our data, the scatter for different intellectual functions reinforces the objection to the widespread use of gross M.A. or I.Q. scores without diagnostic refinement. Our intellectual capacities apparently do not grow evenly or uniformly, as clinicians have long known.

One further apparent discrepancy in his intelligence scores should be examined here. His tested mental age at 20 years of age, hypnotized, is almost 2 years higher than his score at 23 years, awake. It will be recalled that at 23, N. was an hysterical patient, suffering from anxieties which were not equally active at 20 years of age. It may appear that through this hypnotic technique, his personality development and life experiences beyond the hypnotized age level (of 20 years) were somehow ablated by our procedure and he could, in regression, utilize capacities which, because of his current maladjustment (at age 23), were not available to him when awake. The nature of the Binet test items at these higher age levels does not allow a diagnostic evaluation of the pattern of his specific type of decreased intellectual efficiency, from the test at 20 (hypnotized) to that at 23 (awake). Later reports will discuss this problem.

N.'s grappling with a test item at one regressed period appears neither to assist nor deter him in any subsequent meeting with the same item, when amnesia is suggested. However, it cannot be assumed that the test experience, even under hypnotic regression, is totally without influence. It remains to be described and explained how such test experiences under hypnotic regression are incorporated into the continuity of life experience.

How concrete and specific is the life history moment selected for the regression? A precise answer to this problem would help to define the regressions as either

[2] Chronological age.

actual releases or unconscious estimations. Perhaps these are not conflicting alternatives. A minor attempt was made to investigate this problem. Eighteen months after he had taken the Binet when awake, N. was hypnotized and regressed back to the day of the test, eighteen months previous, and was given the test again. There was no admitted memory for the test items. The results are a score slightly higher than his original when awake, and his pattern of responses differ. It appeared to be a somewhat different moment in his life experience. Much more systematic study of this type is essential, and with more sensitive instruments.

The Stanford-Binet data are, however, far from exhausted. Scatter analyses of each age level are in preparation. Also a consistent analysis of the manifestations of the same psychological function at all possible regressed age-levels will be offered, as far as the Binet test permits such differential study. We wish to present a brief sample of these data, the vocabulary functioning at the various age levels. N.'s definitions for two words from the vocabulary list are presented in Tables III-A and III-B.

TABLE III-A

BINET VOCABULARY SAMPLE

ORANGE [3]

Hypnotic age		Score	Definition
Year	Month		
4	0	+	To eat; (Q) looks like a ball
5	0	−	Don't know [4]
5	9	+	Something you eat
6	0	+	Something you eat (Q)—
8	0	+	Something you eat (Q) round and orange color
11	0	+	Something you eat
12	0	+	A fruit
14	0	+	A citrus fruit
17	0	+	Orange is a citrus fruit grown in Florida and California
20	0	+	A sweet citrus fruit grown in California and Florida
23	5 (awake)	+	Either a color of the spectrum or citrus fruit

[3] There are three distinct types of response in this tabulation: (a) The definitions given from the 4 to 11 year levels are essentially functional, "something you eat," after the appropriate concrete definition, "like a ball," at 4 years. (b) The definitions given from the 12 to 20 year levels are "a fruit" modified and described as to the type of fruit that it is. (c) The definition on the 23-5 level gives the alternative abstract concepts, "color" and "fruit." Three stages in concept formation are clearly outlined in the series of definitions.

[4] An instance of "forgetting" at the possibly disturbed 5 year level, just prior to moving to the city. It is important to note that the subject's entire test performance at the 5 year level was characterized by a marked degree of shyness and inclination to distrust his own ability. Further correlation to life history is essential.

TABLE III-B

BINET VOCABULARY SAMPLE

LECTURE [5, 6]

Hypnotic age		Score	Definition
Year	Month		
4	0	−	Don't know
5	0	−	Don't know
5	9	−	Raise Cain (Q) get a talking to
6	0	+	A talking to (Q) when Mom gives you the dickens; when I fight with Henry, I always do (Henry is subject's brother)
8	0	+	Scold (Q) Mummy usually fusses
11	0	+	Fuss; scold (Q) someone gives you the dickens
12	0	+	Fuss; scold (Q) what Mum does when she gives you a talking to
14	0	+	To talk (Q) given by school teachers
17	0	+	An instructive talk
20	0	+	An illustrative or instructive talk
23	5 (awake)	+	An instructive talk or speech

[5] Up to the 12 year age level the stimulus word, "lecture," has the distinct connotation of scolding to the subject—since "lecture" was always used in the subject's family circle in this connection. This also may explain why this relatively difficult word was learned at the 6 year age level. It is not until the 14 year level that the more abstract conception of "lecture" is offered by the subject.

[6] Once again, the data demonstrate a growth in conceptual-abstraction level. The absence of discriminative scoring for the different levels of conceptualization is characteristic of most vocabulary and other mental tests in use, and constitutes another psychometric crudity which this data points up. Future psychometric instruments will allow for a correlation of cenceptual levels and types with the stage and status of ego development. (See Werner, Heinz. *Comparative Psychology of Mental Development*, Harper & Brothers 1941. Especially Chapters IX and X.)

PERSPECTIVE

The hypnotic ablation technique presented constitutes, we feel, a more controlled and dynamic approach to hypnotic regression phenomena by confronting the regressed person with tasks and challenges which may yield measurable indications of the personality development and dynamics at selected age levels in his past, rather than to collect life history data only. Each age level may then be studied for the quality and degree of integration of his capacities for adaptation.

Further refinement of the method may facilitate a longitudinal perspective, through a systematic correlation of the resulting cross-sectional test data, about the *same* individual. It may then become possible to carry out spot retrospective testing of basic psychogenetic hypotheses through a controlled study of selected regressed stages. Thus, the total procedure may offer an hypnogenetic device for the study of personality development.

SUMMARY

1. A preliminary report is made on a development in technique of hypnotic regression. The prominent features are (a) suggesting specific birthdays, (b) avoiding any other suggestion that might interfere with a spontaneous self-orientation, (c) introducing into the regressed situation a third person, without hypnotic influence upon the subject, to administer the clinical testing.

2. This technique apparently results in a blocking out or ablation of all personality developments from the present back to the specified birthday, thus releasing authentic personality-intelligence manifestations of the appropriate age level.

3. Some Binet intelligence test data are presented in illustration, and several theoretical implications are discussed in the context of the data.

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SPECIAL COMMITTEE ON PSYCHOSOMATIC MEDICINE

The President of the Medical Society of the County of New York, Dr. Kirby Dwight, has announced the appointment of a Special Committee on Psychosomatic Medicine. Dr. Carl Binger is Chairman, and Drs. George E. Daniels, Harold B. Wolff and Edwin G. Zabriskie are members.

This Committee, all of whom are members of the American Society for Research in Psychosomatic Problems, will work in close cooperation with this Society in planning a program of post-graduate study and discussion for the members of the Medical Society of the County of New York.

PSYCHOSOMATIC REGRESSION IN THERAPEUTIC EPILEPSY

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Hughlings Jackson maintained that an epileptic fit resulted in a process of nervous dissolution, a "taking to pieces" of the nervous system in the reverse order to that of evolution. This dissolution proceeded from the least organized, most complex and most voluntary towards the most organized, most simple and most automatic. The introduction of the convulsion treatment of mental disorder has afforded a splendid opportunity for studying more closely the teaching of this great thinker, and applying the fruits of later discovery to his theory. The present paper is the result of such a study, and although the investigations were made almost entirely on insane people, the reader may rest assured that every symptom discussed appeared as the direct result of the convulsive process, and did not exist apart from this. In the title and throughout the paper the word "regression" is used instead of "dissolution" because it possesses a more distinctly psychological flavor, and makes greater appeal to psychiatrists. It is not, however, employed in its restricted psychoanalytic sense, viz., as representing a tendency on the part of the sexual instinct to revert to an earlier phase of development, but in a much wider sense to include the reactivation of any reaction pattern belonging to an earlier stage of psychic or somatic organization.

SOMATIC REGRESSION

The therapeutic fit is induced either by the injection of a chemical substance, or by the passage of an electric current for a fraction of a second through the frontal lobes of the brain. It is now so widely employed, and its characteristics are so well known, that it is unnecessary to describe it except in the briefest terms. It consists of a preliminary start, or, where cardiazol is the convulsant, a series of starts, which are followed by tonic, and later by clonic spasms, the whole fit being over in well under a minute.

(a) *The Startle Reaction*

The start, or startle, which precedes the fit may be considered as a separate entity, because where the stimulus is below threshold value this constitutes the only motor response. It consists of a sudden momentary stiffening of all the muscles, associated with a forward jerk of the arms and legs. In the cardiazol fit, instead of a single preliminary start, there are a number of starts, and this provides a better opportunity for analyzing the reaction. Such multiple starts reveal a tendency on the part of the limbs to jerk not only forwards, but also to a certain extent outwards and then inwards. There is, therefore, a suggestion of clasping which is reminiscent of the Moro reflex of infancy. Dewey (3) describes the Moro reflex as follows: "When an infant is laid on its back on a table, and the table is struck on either side of the infant, the arms are spread apart and then brought together in the form of a bow; at the same time the legs make similar movements." Sometimes the start which precedes a cardiazol convulsion closely resembles the classical Moro reflex, but in the electrically induced fit it is far more like one of the modifications of the Moro reflex which have been described by various observers. One of these, which Valentine (10) calls the "arm-raising reflex," consists in the throwing up of the arms over the head in response to a loud strange noise or other cause of shock, and is most likely to be evoked when the infant is asleep. Nobody who takes the trouble to study these start reflexes of infancy will be left in any doubt as to the striking similarity which they present to the starts given by adults before entering upon a therapeutic fit. Moreover, in both child and adult the start gives one the impression of being of the nature of a "fear" response, and as being directed, however vaguely, towards self-preservation. But after a few months of infancy the start reflexes die out, although they may be occasionally re-awakened in adult life by a sudden unexpected noise, such as the banging of a door. The suggestion is, therefore, put forward that the starts which precede the therapeutic fit represent momentary regressions to the "fear" reactions of infancy, brought about by a *sudden* disturbance of nervous equilibrium.

(b) *Tonic and Clonic Phases*

During the tonic phase of the fit the whole body becomes a rigid, log-like mass, which can be rolled about in one piece, the posture resembling that of decerebrate rigidity. There is marked extension of the lower extremities, opisthotonos and head retraction. The arms are more often semi-flexed and pronated than fully extended, but this may only mean that we are dealing with a decortication rather than with a true decerebration. The resemblance to decerebrate rigidity is further enhanced by the existence of muscular "plasticity," a manifestation which is said to accompany the decerebrate rigidity of animals. If, during the tonic

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phase of the fit, the patient's arm be forcibly flexed or extended at the elbow, the limb tends to remain in either of these positions until the clonic spasms supervene. The presence of such "shortening" and "lengthening" reactions demonstrates that, despite the intensity of the spasm and its generalized distribution, the skeletal musculature is not entirely bereft of nervous organization.

Decerebrate rigidity is produced in animals by sectioning the brain above the pons, thereby removing the inhibitory influence of higher centres. It is, therefore, primarily a release phenomenon, but in view of the fact that Barcroft has observed a similar condition in the sheep foetus, a further interpretation can be read into it. Barcroft has shown that the sheep foetus passes through a brief stage of decerebrate rigidity in the normal course of its development. He says (2), "By the sixtieth day, if the foetus be delivered, it exhibits a different picture; the forelegs are tensely stretched out side by side, the head and tail are extended, and the foetus presents the appearance of an animal suffering from what is known as 'decerebrate rigidity'." This postural rigidity does not, according to Barcroft, last many days, and by the seventieth day it has become completely dominated by inhibition.

If the human foetus passes through a similar phase of decerebrate rigidity during the course of its development, then the manifestation of this condition during a therapeutic fit represents, not only a process of release, but also one of regression. We know so little about the behaviour of the human foetus that we cannot say how far it is comparable to that of the sheep, but it is highly significant that certain infants born well in advance of their proper time have exhibited some at least of the characteristics of the decerebrate condition, together with the reflexes of Magnus and De Kleijn (8). If we study Barcroft's experiments further, however, additional evidence presents itself which suggests that not only the tonic, but also the clonic, stages of the therapeutic fit may represent a recapitulation of the behaviour patterns of foetal life. Barcroft (1) found that the normal foetus of the sheep showed movements of certain well-defined types at different ages in response to stimulation. When the foetus was about 40 days old these movements were rapid and "jerky," whereas in older foetuses (about 50 days) they were drawn out and "sustained." It was during the later period of this second phase that the decerebrate attitude was presented. By the seventieth day, however, the foetus became quiescent owing to the operation of inhibitory impulses from the upper part of the forebrain. But if during this final period of quiescence the foetus were exposed and pressure exerted on the umbilical cord, the quiescence was abolished, and movements were produced which were first of the "sustained" type typical of the 50-day normal foetus, and, thereafter, of the "jerky" type typical of the 40-day normal foetus. In other words, the effect of the asphyxia produced by pressure on the cord was to abolish the functions of the brain and spinal cord in the reverse order to that in which they had been evolved, so that there was first a release of the more recently evolved "sustained" movements, and then of the more primitive movements of the "jerky" type.[1] Now this, on a different plane, is what Hughlings Jackson envisaged as taking place in the human subject as a result of epileptic discharges of varying intensity. The dissolution proceeds from the least organized neural structures to the most organized, earlier and earlier reaction patterns becoming released as the epileptic process spreads. Curiously enough, Hughlings Jackson never seems to have associated the convulsive movements themselves with this process of release, but only the manifestations which follow the fit. This is rather remarkable in view of his penetrating inferences in other directions. However, Barcroft's work, published over half a century later, introduces the possibility that the tonic and clonic movements of the convulsion represent a reactivation by release of two distinct types of foetal behaviour pattern. Such general differences between the sheep and human movements as are apparent from Barcroft's cinematograph studies of the sheep experiments could readily be attributed to a difference in the *speed* of release. Asphyxia would produce a relatively slow release, whereas a chemical convulsant, or an electric current passed through the brain, would act more rapidly. To quote Hughlings Jackson (6): "a more rapid liberation of energy gives rise to nerve currents of greater force—that is, to currents capable of overcoming lines of greater resistance—than does a slower liberation of an equal quantity of energy." It is to be hoped that despite the many difficulties in the way, Barcroft will be able to extend his studies to the human foetus whose behaviour is in urgent need of further investigation.

(c) *Infantile Behaviour*

If the tonic and clonic stages of the therapeutic fit represent a return to the foetal level of nervous functioning, we should expect during the subsequent period of recovery some, at least, of the behaviour patterns of childhood to become apparent. For the process of nervous re-evolution which succeeds the dissolution implies a "growing up" in the sphere of behaviour. It

[1] When first I read of this experiment I could not help recalling the popular belief that when people are in danger of drowning their whole past life passes before them.

is, perhaps, relevant to mention that after the fit has terminated, and the unconscious patient lies limp and immobile, a second wave of tonic spasm may sweep over the musculature. Sometimes this lasts for only a second, but it may be prolonged for over a minute. It can involve either the lower limbs alone, or the whole body, and in the latter event the decerebrate attitude is again assumed, *i.e.*, extension of the body and limbs, head retraction and opisthotonos. I mention this secondary tonic spasm because it seems to be the logical sequel to the clonic phase, if we assume that the latter marks the lowest limit of the dissolution. The secondary wave of tonicity constitutes the first step towards re-evolution.

The first evidence of infantile behaviour after a fit is provided by the development of sucking movements. While these may be identical with the sucking movements of infancy, they often tend to merge into chewing movements. If, during the course of these sucking movements, the teat of a baby's bottle containing milk be placed between the patient's lips, a little milk may be sucked and swallowed, but the movements are quite independent of peripheral stimulation. As a matter of fact, the sucking movements of infants can also arise in the absence of lip stimulation; I have noticed them again and again in sleeping infants.

Apart from the sucking movements, there may be writhings, twistings, and rollings of the body, mass movements which are very like those exhibited by an infant in its cot. One favourite antic is for the patient to arch his back and, supporting himself at one end on his occiput and shoulders, and at the other end on the soles of his feet, propel himself along the couch by a series of heaving movements. I have frequently watched infants of a year and under exerting themselves in the same way, apparently for the purpose of escaping from a patch of wet in the bedding. Another peculiar antic is that of kneeling on the couch and lowering the head on the pillow, as though doing homage to a deity. A similar attitude is sometimes assumed in the nursery, and now and then an infant will go to sleep in this extraordinary position, with its little buttocks pointing skywards like the apex of a pyramid.

Other movements after the fit take the form of bouncing up and down in bed, or of turning somersaults, both of which are highly popular activities in childhood. But it is, perhaps, by the babyish whimpering and crying, in which these patients sometimes indulge, that the onlooker is most forcibly reminded of childhood. This is often typical, and when it is exhibited by middle-aged men creates a most incongruous impression. It is often supplemented by querulous appeals for "Mummy," and a tendency to nestle up to the doctor in the manner of a child seeking the protection of its mother. Here there can be no doubt about the regression.

Another very interesting post-convulsive phenomenon, which is clearly regressive in nature, can often be evoked a few minutes after a convulsion when the patient has settled down to quiescence, and is apparently asleep. If, under these conditions, his name be sharply called, he may jump up with a startled cry and assume momentarily an expression of abject terror. There is, however, one peculiarity about this facial expression which establishes its relationship with childhood beyond doubt. I refer to a certain "squaring" of the mouth, brought about by retraction of the upper lip and drooping of the lower one. Everybody has witnessed similar "squaring" of the mouth in young children who are on the verge of tears,[2] but who has seen it in a normal adult?

PSYCHOLOGICAL REGRESSION

So far, we have been considering different aspects of behaviour exhibited while the patient is unconscious, or nearly so. We can now turn our attention to a later phase of recovery during which there is evidence of psychological functioning of a very interesting and unusual kind. As a rule, five to ten minutes after a therapeutic fit any initial restlessness will have disappeared, and the patient will have sunk into a condition of unconscious quiescence which later merges into ordinary sleep. But during this period of quiescence partial rapport can be established with the patient by means of repeated questioning and stimulation, although he shows a distinct dislike of being awakened, and much resistance has to be overcome before satisfactory contact is achieved. I have elsewhere (9) referred to this condition as the "dreamy state," because in certain respects it seems to correspond to the dreamy state described by Hughlings Jackson as following mild epileptic fits. It is an extremely difficult state to investigate because during the early stages of it the patient will sink back into apparent unconsciousness the moment stimulation is discontinued, while even in the later stages there is considerable fluctuation in the level of mental functioning. One minute there is ability to perform tests which are quite impossible of achievement the next, and the observer has no sooner caught a glimpse of a particular mechanism than it disappears and is replaced by another of a different order. There is a subsequent amnesia for everything that is said and done during this state, and if the patient be told about his activities afterwards, he will express amazement and

[2] Darwin has drawn attention to this in his "Expression of the Emotions," pp. 148, 151.

incredulity. Infinite patience and perseverance are required on the part of the physician, but the effort is well worth while, because we are here dealing with nothing less than the very beginnings of mind.

(a) *Aphasia*

Patients in the dreamy state exhibit all grades of aphasia from the most severe to the mildest. At first, they are only capable of uttering a few words, but their vocabulary soon extends. They may misplace words or syllables, use utterly nonsensical words, or leave out words altogether. They may even talk complete jargon. Only the simplest propositions are understood, and all requests made to them have to be framed most carefully. Mistakes are made in the naming of simple objects, and there is much misinterpretation as to their use. Repetition and perseveration are marked features of the aphasia. As recovery from the fit proceeds, defects of symbolic formulation and expression become much less obtrusive, and are only betrayed by an occasional misplaced word or syllable, or by the misinterpretation of some request. While it is impossible to carry out a systematic investigation of the aphasia owing to lack of cooperation on the part of the patient, such evidence as is available does not indicate that the speech defect can be classified in any of Head's categories, viz., verbal, nominal, semantic or syntactical. Thus, the fact that requests are interpreted in a narrower, more restricted sense than usual suggests semantic aphasia. A patient who has just written his name, when told to add the address promptly writes the word "address." Another, having given his name as Smith, is asked to spell it, but responds by spelling the word "it." A third is handed a jigsaw puzzle and told to "put it together," whereupon he collects the pieces into a pile. A fourth, on being shown a model clock and asked to "put the hands at 12:35," places *his own hands* in the appropriate position on the clock-face. A fifth, in reply to the question, "Where are you?," says, "Lying on a bed," although in reply to the same question in his waking state he says, "In hospital." All these reactions seem to imply semantic aphasia. On the other hand, the reduced vocabulary, the abnormal structure of words, and the fact that a word different from the one spoken may be written, suggest an aphasia of the verbal type. But, against this, the difficulty in naming certain objects, and the tendency to substitute for the name a roundabout description of the object's function, favour nominal aphasia. One man called a petrol-lighter "what you get a light with"; another said it was "a box of matches," and a third described it vaguely as "some kind of lamp." Finally, the frequency with which these aphasics indulge in jargon talk might signify syntactical defect.

Although it is impossible to fit post-convulsive aphasia into any of Head's categories, and, to my mind, it is unprofitable to try to do so, there is another aspect of it which has a bearing on our present study. I refer to its regressive features. Aphasia, in general, presents characteristics suggestive of a return to infantile modes of expression, a fact which was recognized by Head, although he did not seem to attach a great deal of importance to it. He says (5): "That form of behaviour which we call the use of language has a history, and many of the phenomena of disordered speech resemble the stages by which the complete act was developed in each individual. The patient describes an object or mentions its use instead of giving it a name; he spells the words he is reading instead of recognizing them directly; he counts on his fingers when he should add or subtract." All these symptoms can be noted in the post-convulsive state. But Head continues: "But the mechanism underlying symbolic formulation and expression is not a palimpsest from which, when the more recent writing is removed, an earlier text is revealed in a primitive form. The aphasic may return to the less exacting methods of solving a problem which resemble those adopted in childhood; but his mind differs fundamentally from that of a child. In the earlier days, when he was acquiring the use of language, he gradually refined and extended his verbal aptitudes and power of employing symbols of all kinds. When these are disturbed in consequence of physiological defects he falls back on methods of arriving at the desired result corresponding to the steps by which he acquired the art of using language. Thus, he describes a colour by comparing it to a concrete object, although he cannot give its name; blue is like the sky, red is blood and green resembles grass. Apart, however, from the adoption of a form of response more prevalent in childhood, the phenomena of disordered speech do not strictly correspond to stages of its historical development." Unfortunately, Head makes little further reference to this aspect of aphasia throughout the two volumes which he devoted to the subject.

Returning to the infantile features of post-convulsive aphasia, there is, as in Head's cases, no evidence of uniform regression, but a breaking through in places of infantile modes of verbal functioning. This intrusion of the mechanisms of childhood upon those of adult life becomes all the more striking when we refer to recent work on baby language. We know a great deal more now than we did in Head's time of how speech is developed in infancy, and, in the light of this increased knowledge, it is possible to detect in his case reports instances of regression which he failed to observe, or, at any rate, to comment on. This is particularly the case in verbal aphasia where M. Lewis (7)

has shown that the symptoms parallel in detail the mistakes made by infants in learning to speak. In infancy, according to Lewis, a child when trying to master an unfamiliar word is liable to revert in his speech to an ontogenetically earlier mode of functioning, and the aphasic tends to do the same thing. Lewis concludes: "Thus not only outwardly, but fundamentally also, baby-language and Verbal Aphasia are seen to be alike. The child as a result of his inexperience, and the aphasic as a result of his physical defect, tend to produce familiar, simpler, modes of vocal activity in their efforts to make instrumental use of the complicated forms of human language."

Let us now examine certain regressive features in reading and writing which are presented by patients in the dreamy state. Some of the points mentioned appear very trivial, but I have included them as they help to complete the picture.

Reading. A standard reading test is given before the treatment is commenced, and again after each individual fit. It consists of the first page of a very simple edition of Puss in Boots. The print is large and the words simple, both great advantages in dealing with a person in the dreamy state. But this particular test provides the additional advantage that it can be given to young children as well, and it becomes thereby possible to compare their mistakes with those of the aphasic adult. The type of error made by each is in many respects similar. The test passage runs as follows:

> Once upon a time there lived a Miller
> with his three sons. He was very poor
> and all he had to leave when he died
> were the Mill—a donkey—and a cat.
>
> The cat was left to the youngest son
> Jack—who was very sad—
> although he loved Puss.
> "But how can I earn my
> living with a cat?" he said,
>
> "Do not worry my Master," said
> Puss, "Buy me a pair of boots
> and I will show you."

Let us begin by enumerating a few childish characteristics in the *method* of reading the passage after the fit. Some patients, if tested at a very early stage of recovery, commence their reading in a soprano voice, and, as they proceed, the voice becomes lower. Some read in a whisper, halting a little after each word. Some adopt a sing-song intonation; or recite the words in the manner of a poem. Some lapse into jargon, but the jargon may be phrased as if it made sense. A very few include the punctuation marks in their reading, as many of us did in the infant school. I may add that one man, when asked to read the passage at a very late stage of recovery, said, "Shall I stand up?"—another echo of the class room.

Apart from the manner of reading, the mistakes made after a fit are in many respects similar to those made by children between the ages of 7 and 9. Thus, words and sentences are frequently omitted, or new words substituted for them. Syllables may be reversed, omitted or elided. The word "youngest" may be changed to "yousest"; "although" into "athough" or "athug"; "died" into "did"; "sons" into "so"; "Puss" into "Pussy"; "with" into "which"; "who" into "how"; "loved" into "lived."

In almost every case there is betrayed some evidence of perseveration. Words or sentences may be read repeatedly, so that progress is slow. Sometimes there is difficulty in getting beyond the opening phrase "Once upon a time," the patient going over this again and again, and refusing to leave it. But, more commonly, there is manifested what I propose to call *latent* perseveration. This consists in the reappearance after an interval of normal reading of a word, or part of a word, which has appeared earlier in the text. Here are some examples:

(1) The following three mistakes were made by one patient: (a) "all he had to leave when he died were the *sons*" read for "all he had to leave when he died were the *Mill—a donkey—and a cat.*" (b) "who was very *son*" read for "who was very *sad.*" (c) "how can I earn my living with a *son?*" read for "how can I earn my living with a *cat?*"

The words "sons" and "son" occur once in the text, but they evidently lingered in the patient's mind, and, as a result, were reproduced at intervals.

(2) "The *Mill* was left to the youngest son" read for "The *cat* was left to the the youngest son." The word "Mill" occurs in the previous sentence.

(3) "How can I *leave* my living?" read for "how can I *earn* my living?" The word "leave" occurs in the third line of the text, and presumably, persisted in latent form.

(4) "All he had to leave when he *lived*" read for "all he had to leave when he *died.*" The word "lived" has evidently persisted from the opening sentence.

(5) "When he died *when* the Mill" read for "when he died *were* the Mill." Here the persistence is obvious. Further on, this patient read "But *when* I earn my living" for "But *how* can I earn my living." Thus, the original "when" was repeated twice.

(6) A man who had been asked to give my name just before commencing to read, began "Once upon a *Power* there lived a *Power.*"

Latent perseveration may give rise to the formation of composite words. Thus, a common error is to read "But how can I *learn*" for "But how can I *earn*," the letter "l," or the feel of it, persisting from "loved" in the previous line. Again, "when he died *were* the Mill" may be rendered "when he died *where* the Mill," the "wh" persisting from the previous "when." One patient read "all he had to *threave*" for "all he had to *leave*," the word "three" being obviously carried over from the previous sentence and incorporated into "leave." Many patients read "*Bury* me a pair of boots" for "*Buy* me a pair of boots." This seemed to be due to an echo of the word "worry" spoken shortly before (Buy + worry = bury).

Of course, these mild types of latent perseveration are very similar to those exhibited by normal people, but they occur to an exaggerated degree after a convulsion, and shade off into repetition of a graver type. The regressive significance of all this will be considered in a later section.

Writing. It is usual to begin by asking a patient in the dreamy state to write his name and address, an action which in most people has become so automatic that it can be carried out with a minimum of thought. The specimen so obtained is then compared with one written immediately before the fit, and any differences between the two noted. First, a word about changes in the character of the writing. In about 70 per cent of cases the handwriting after the fit is larger than before it. Sometimes this is only a matter of degree, while now and then the size transcends all normal bounds, and the signature fills up a whole page of foolscap. Very occasionally, the writing after a fit shows an improvement on the pre-fit writing. One man, who before discharge from the hospital was shown some of this exceptional post-convulsive writing, remarked that it was not "as good" as his normal writing. When I told him that in my opinion it was much better, he replied, significantly enough, "Oh yes, it is clearer, but it is like a child's writing." The tendency to form large characters after a fit is, doubtless, primarily due to the general lack of nervous inhibition which is so prominent a feature of the post-convulsive state, the patient being temporarily robbed of the power of executing fine movements with a pencil. But it must be remembered that children are taught in the first instance to make big letters because writing comes easier to them in this way, so that it is just possible that in this aspect of post-convulsive writing there is an element of regression.

Sometimes printed characters are employed after a fit, although the pre-fit writing was in cursive style. This, again, is a reminder of childhood, for children are always begun on printed characters, and only later do they learn to link their letters. We have here, therefore, another example of what has already been noted in aphasic speech: faced with a difficulty of adjustment, the patient falls back on an earlier mode of behaviour. There are one or two further minor points which remind one of the infant school. When an error in writing has been made by a patient in the dreamy state, he will sometimes wet his finger and try to *rub out* his mistake, as though he were using a slate instead of paper. Again, the meticulous care exercised in putting in punctuation, crossing "t"s, and dotting "i"s, may also be an echo of the past, for adults are liable to become slapdash about such things. But as in speech, so in writing, there is no clear-cut regression to the methods of childhood. There is merely an irregular intrusion of the ways of the child upon those of the adult, so that here and there a childish characteristic appears.

In writing, as in reading, there is much repetition. A signature may be written not once, but a score of times, and syllables, letters, and even parts of letters are liable to recur. Furthermore, as in reading, the repetition is often not immediate; the persisting element can lie dormant for a little, and then intrude upon a later word or syllable. The following are some examples of perseveration in writing:

(1) R. W. Smith, Lewardstone Rd Rd Lewardstone Rd Rd Lewardstone Rd Rd ardstone Rd Rd Rd Rd Rd Rd
(2) London Rd, Grays, Essex, Essex
(3) John Grifffiths
(4) Woodford Green Essxxx
(5) Digby Gardenss, Dagenensesesags (for Digby Gardens, Dagenham)
(6) Htanly Htanly ssanLYSAUNDEAAUNDERRS (for Htanley Saunders)
(7) Banstead Menstead Hospital (for Banstead Mental Hospital)
(8) E17 Walthamstow E17 Walthamstow E17 E17 E17.

The material written by a patient who is asked to write his name and address after a fit presents features of the greatest interest. In a series of 76 patients from whom names and addresses were obtained before and after convulsions 41 gave different addresses after the fit. These post-convulsive addresses were places where the patient had lived at an earlier period of his life, and in a number of instances represented his birthplace. No patient had any subsequent recollection of what he had written in the dreamy state, and those who were told about it afterwards were frankly amazed. One man, aged 42, on being shown on recovery the address he had written, said, "What an

extraordinary thing that one should go right back to one's childhood. That is where my mother lives; where I spent all my childhood." There is little doubt that in this series of patients a larger number would have written a former address after their fits had not many of them been young men who had always lived at the same address. In case it should be thought that these earlier addresses were given solely because they were more familiar, and, therefore, better organized in the patient's mind, it must be mentioned that in several instances the patients had resided at these former addresses for shorter periods than at the more recent ones. One might be tempted to postulate a strictly chronological regression were it not for the fact that simultaneously there was awareness of experiences relating to later periods of life. Thus, a man might write the address of his childhood and yet be fully aware that he had a wife and family, which he had acquired much later. Instead of a clear-cut regression, there is a telescoping of the events of a life-time with the accent strongly on the distant past. Sometimes this process of telescoping results in the writing of a composite address. A patient after a fit wrote his address as 3 Kings Street, Cadford. His present address was 3 Hazelwood Road, Leyton, but he had formerly lived at Livingstone Road, Catford, and he had spent his childhood at 5 Kings Street, Deptford. The number of the house, therefore, referred to his present address, the street to that of his childhood, and Cadford seemed to be a combination of Catford and Deptford.

Apart from giving an old address after a fit, the patient may betray a return to older channels of thought by writing a name which he once used, but has long discarded. Two men, to my astonishment, wrote surnames other than those by which I had always known them, and it was ascertained afterwards that they had changed their names over 15 years previously. In both instances the former names, *i.e.*, the ones written in the dreamy state, carried with them very painful memories.

(b) *Further Evidence of Regression*

As recovery from the fit proceeds and it becomes possible to establish closer rapport with the patient, further evidence of regression may be forthcoming. Thus, the names given to certain objects are apt to savor of the nursery, and to be different from those used by the patient in his fully waking state. A toy rabbit may be called a "bunny rabbit," and a toy penguin described as either a "dicky bird," an "elephant," or "Pip" (from Pip, Squeak & Wilfred). Again, the patient may revert to the dialect of the district in which he spent his youth, although in his waking state he exhibits no trace of this. Or, the methods of doing sums which were employed in childhood may be resurrected. One man, a clerk by occupation, when asked to do the sum 4+8+9+5, tried ineffectually to add the figures up by making groups of dots with a pencil, whereas in his waking state he gave one glance at the sum and wrote down the answer stright away.

But the regression need not extend back to childhood. In the later stages of recovery it is much shallower in type, and limited to the putting back of the calendar a few years. Patients frequently give their age as less than it is, some subtracting two or three years and others taking off as much as ten. The ages of the children may also have a year or two deducted. Some men, when asked to give their wife's name, give her maiden name instead, perhaps adding "at least, that was her name before I married her." A test I sometimes give during the dreamy state is to show the patient a packet of Players Cigarettes and ask the price of it. As often as not the pre-war price is given, and adhered to in spite of argument.

The following observations are of particular interest as indicating slight regression. Several men past middle-age, when being urged to write their names after a convulsion, were asked if they needed their spectacles. To my surprise, they denied that they wore them. In one instance after such a denial the man's glasses were unobtrusively slipped on, and the question again put to him. But again he denied that he wore glasses, although as he spoke his hand automatically went up and touched them. It may be the same with teeth: a number of edentulous patients deny during the dreamy state that they have had their teeth extracted. One man who argued thus was asked to look in the mirror and point to his teeth. He at once pointed to his bare gums and said, "There are my teeth." Similar observations were made in regard to the colour of the hair. Elderly men whose hair is white or very grey may after each fit insist that their hair is black or brown, or even golden, although in the intervals between the fits they are well aware of the true state of affairs. From such statements regarding spectacles, teeth and hair it is tempting to assume that the patients actually feel a number of years younger, and that reality is made to conform to their feelings. This may be so, but again the warning must be sounded that such regressions are not uniform, for there may be simultaneous knowledge of events which occurred *after* the removal of the teeth, the greying of the hair, and the adoption of spectacles.

In the dreamy state, although memories and habits of the past are resurrected, the happenings of more recent years are by no means necessarily obliterated. While there is definite impairment of memory for very recent events, the patient can give many facts about

his present home life and circumstances. As I have already said, there is a tendency to telescope experience so that events belonging to different periods of the patient's life combine to form a composite picture. Good instances of this were furnished by some of the older men who, when questioned about the war, tended to fuse events of the 1914-1918 war with those of the present one. For example, one patient knew that Churchill was the present Prime Minister and Roosevelt the President of the U.S.A., but at the same time thought that Pershing commanded the U.S.A. troops. Another, who was quite clear about the present belligerents, thought that Beatty was in command of the fleet. A third man knew all about Churchill, Roosevelt and Mussolini, but insisted that the Kaiser was head of Germany and the Czar still ruled Russia. This last patient was 38 years of age, so that his regression must have brought him back to the age of about 13. This same telescoping of experience was shown in another way by a man who was a great football enthusiast. On being asked during the dreamy state to give the names of the players of a well-known team, he included the names of some who had played for the team about 15 years previously, *i.e.*, he gave a team composed of past and present players.

Perhaps the clearest evidence of the fusing of psychological material after a fit is afforded by the tendency to identify the doctor with people whom the patient has known in the past. A man who is recovering from a fit may mistake the doctor for one of his parents, his old schoolmaster, a former medical attendant, a clergyman, a foreman or an officer—in fact, with anyone who has been in a position of authority over him. But, although the doctor is called by the names of these people, he is also recognized for what he really is, so that to the patient he represents two or more people rolled into one. In answer to the question "Who am I?" the patient may one moment reply, "You are my father," and a moment later, "You are the doctor." One man said I was "Doctor Madill," and it turned out afterwards that this referred to a Major Madill (not a doctor) who had been the patient's superior officer some 20 years before. The patient had admired this Major Madill very much, and when I told him of his mistake on recovery from the fit, he said, "If I mistook you for Major Madill it was a great compliment."

A neat example of this fusing of identity was provided by a melancholic, aged 70, who, a few minutes after a convulsion, called me "Doctor Daniels." I asked him where I lived and he replied "Huntingdon Street." Later, when consciousness had fully returned, he was questioned further about these names. He said that a Doctor Daniels had attended him for a similar breakdown 18 years previously, but that he (the patient) had not seen or heard of him since. Huntingdon Street was the name of the street where the family doctor, a Doctor Jackson, had resided in the patient's youth, some 60 years before. So that to the patient I represented Doctors Daniels and Jackson, and probably also myself, rolled into one.

(c) *Repetition and Perseveration*

Repetition and perseveration in both psychic and somatic spheres are almost invariable accompaniments of the therapeutic fit. They appear to represent different aspects of the same underlying process, and in what follows no attempt will be made to distinguish between them. It does not seem to make much difference from the standpoint of "involuntary persistence" whether an idea intrudes itself on consciousness intermittently or continuously; or, in the somatic sphere, whether there is kinetic or static perseveration. In all four situations one must postulate an abnormal duration of nervous discharge along particular pathways.

Very occasionally, it is possible shortly after a fit to demonstrate perseveration at the reflex level. To do this it is necessary to slide the unconscious patient down to the end of the couch, so that his legs hang from the knees over the edge. In this position, when the patellar tendon is struck, the leg may not only give an extensor jerk but remain extended for a few seconds.[3] Alternatively, in response to a single tap on the patellar tendon a *series* of extensor movements may occur. I do not refer to a pendular effect such as might arise where the muscles were unduly atonic, but to strong rhythmic contractions of the quadriceps, which, although the patient is unconscious, are uncannily like deliberate movements of extension. But such forms of repetition are rare.

As recovery from the fit proceeds and restlessness develops, a repetitive movement may arise out of some vaguely purposeful action. Thus, a patient may repeat over and over again the movement of drawing the covering blanket up to his chin; or another, whose hair has been pulled, may continue rhythmically to execute defensive movements long after the hair-pulling has ceased. At this stage, also, fixed attitudes of the catatonic type may be observed. Whether or not any form of mental functioning accompanies such movements and fixations it is impossible to tell, because verbal contact with the patient is out of the question.

[3] Care should be taken to distinguish between this sustained contraction of the extensor muscles in response to an external stimulus, and the spontaneous waves of extensor spasm which are liable to sweep over the musculature after the conclusion of the fit.

Once rapport has been established, repetition of a higher order can be evoked. A man who is well advanced towards recovery is given a hairbrush and asked to use it. This he does in the ordinary way. The hairbrush is then taken away and he is handed in succession a toothbrush, a sock and a slipper, and told to use them. However, he uses them all in the manner of a hairbrush, despite the fact that he may be able to name them correctly. Once the idea of hairbrushing has been introduced into his mind, it persists and dominates him for a little. Here there is perseveration of thought rather than of movement, because, although the hairbrushing movements seem very similar on each occasion, they are really not identical, since the varying weight and shape of the objects used necessitate modifications of muscular adjustment. As a matter of fact, in post-convulsive perseveration it is not always easy to decide whether it is the movement which persists, or the idea that lies behind it. A favourite test of mine is to give the patient a needle to thread before and after a fit, and to compare his two performances. After the convulsion there is liable to be much perseveration in carrying out this task. The patient usually begins by trying to thread the needle in the ordinary way, but if, as sometimes happens, it slips from his fingers on to the blanket, he may pick it up with the eye pointing downwards, and thereafter make *persistent* efforts to pass the thread through the pointed end. Alternatively, when he has picked it up, he may try to pass the point of the needle through the thread, *i.e.*, to split the thread with the point of the needle, again persisting long in his efforts. Let us assume, however, that he has succeeded in threading the needle. Even then blind persistence and repetition are likely to appear, for he may continue to pass the thread through the eye of the needle until the latter contains so many strands that it will not admit any more. On the other hand, after threading the needle successfully, he may knot together the free ends of the thread in the ordinary way, and then continue to tie knots until no unknotted thread is left. Or, finally, after the needle has been threaded, he may pass it and the attached thread repeatedly through a buttonhole of his bed-jacket, the vague objective being the passage of something connected with the needle and thread through *any sort of aperture*. This brief description will give some idea of how difficult it may become to form an opinion as to whether there is perseveration of an idea, or mindless repetition of movement. My own impression is that in the needle-threading test, while a fixed and vague idea dominates behaviour, the latter degenerates at times into purely motor repetition.

Sometimes, owing to perseveration two ideas combine. A man who was given a toothbrush to use after he had brushed his hair, instead of using it either as a hairbrush or a toothbrush, effected a compromise between the two. He brought it to the region of his mouth and brushed his lips in a *downward* direction. In this behaviour there were elements of toothbrushing and hairbrushing combined.

Attention has already been called to the occurrence of repetition in reading and writing. It will be remembered that phrases, words, and parts of words were all liable to be repeated. Moreover, words which had occurred earlier in the text were prone to intrude later on, and to become incorporated in other words to form composite structures. But perseveration is also manifested in conversation. A man who has been roused from his post-convulsive sleep may answer the first question put to him quite sensibly, and then give the same answer to subsequent questions. Here again, it is not quite clear whether it is the idea which persists or the motor elements that express it. Undoubtedly, there is ideation involved in the first reply, as it is a rational one, but it is possible that subsequent replies are evoked in the manner of a reflex without there being any psychic concomitants. The patient gives no indication that he is dissatisfied with his "barrel-organism," as do some non-epileptic aphasics, and there seems to be no attempt to say anything different from the words uttered. However, although doubt may exist as to the level of the repetition at this stage of recovery, the part played by ideation becomes quite apparent later on, as the following examples illustrate:

(a) A. B. during recovery from a fit wrote his name correctly on request. He was next asked to read the time on a clock when the hands pointed, first at 1:45, and then at 9:10. He gave the correct answer each time. After this, he was told to set the hands of the clock at 12:35. He did so. Now he was asked to set the hands at "twenty-five minutes to one," but he refused to be caught and pointed out that they were already in that position. He was then shown a number of objects and asked to name them. The first, which was a toy rabbit, he named correctly. The next, which was a toy penguin, he was unable to name. When urged to say what it was, he called it "a kind of bird," "a duck," etc. (He knew the name quite well in his waking state). Suddenly, the character of his answers changed and took the form of clock times, *e.g.*, "ten past one," "one thirty-five," etc. I said to him, "How can that object be one thirty-five?" whereupon he seized the moveable parts of the penguin—beak, wings and feet—and held them in various positions, which were fair approximations of the times stated. He was clearly making

the penguin conform to his previous idea of the clock. It will be noted that he had already named the rabbit correctly, and only reverted to the clock idea when he experienced difficulty with the penguin.

(b) C. D., when recovering from a fit, was shown the same rabbit and penguin. On seeing the rabbit he said it was "a duster" (it was made of cloth). The penguin was next handed to him, but he called it "a duster" also. He was then asked to set the hands of the clock at 12:35, which he did quite correctly. Now the penguin was shown to him again, whereupon he said it was twelve thirty-five." On being urged to explain, he said, "This is twelve," pointing to the bird's beak," and this is thirty-five," twisting the feet around until they corresponded to the position of thirty-five minutes past the hour.

The reader may well ask what all this repetition and perseveration has to do with regression. The answer is that such behaviour is characteristic of infancy and early childhood. Sucking furnishes a simple example. Apart from the rhythmic nature of the movements, sucking is repeated in relation to a host of objects other than the breast and bottle. Many a sore and sodden little thumb bears testimony to this. The fact that the activity may be associated with a degree of "pleasure" should not blind us to its inherent disposition to repeat itself. Young infants frequently perform sucking movements in their sleep when there is no object in the mouth, and, therefore, no peripheral stimulus. Then we have the earliest words, all of which consist of reiterated syllables, *e.g.*, mama, dada, baba, etc. And what about infantile babbling? But all "playing" in infancy bears the hallmark of repetition. Infants are continually performing repetitive antics in their cots. A favourite pastime is to roll the head from side to side for minutes on end. Another is to rhythmically sway the upper part of the body to and fro while in the sitting position. And who has not, to his subsequent regret, become involved in the game of picking up and restoring some toy which is repetitively flung from the cot? Freud has commented on this tendency towards repetition among children. He says (4), "In the play of children we seem to arrive at the conclusion that the child repeats even the unpleasant experiences because through his own activity he gains a far more thorough mastery of the strong impression than was possible by mere passive experience. Every fresh repetition seems to strengthen this mastery for which the child strives." And again, "The child never gets tired of demanding from a grown-up the repetition of a game he has played with him before, till at last the grown-up refuses, utterly worn out; similarly if he has been told a pretty story, he wants always to hear the same story instead of a new one, insists inexorably on exact repetition and corrects each deviation which the narrator lets slip by mistake, which perhaps he even thought to gain new merit by inserting." Freud sees in this compulsion to repeat a fundamental characteristic of primitive instinct, and suggests that it may reflect an innate tendency in living organic matter impelling it towards the reinstatement of an earlier condition which it had to abandon under the influence of external disturbing forces.

The fact that repetition plays such a prominent part in the life of a child justifies us in regarding its appearance after a convulsion as an indication of regression. But, clearly, a further point arises. Without committing ourselves to Freud's view as to its ultimate significance, it is possible to join with him in interpreting involuntary repetition as the reflection of an innate tendency on the part of the organism to recapitulate the past. Admittedly, in post-convulsive repetition it is the *immediate* past which is repeated, but it may well be that the mechanism whereby this is achieved is the same as that which is responsible for the reappearance of the remote past. It is a remarkable fact that in the condition known as senile dementia, where the kind of repetition we have been considering is so conspicuous, the patient also reverts to the ways and experiences of childhood. I have watched scores of such patients during their final weeks of life, and in their rambling talk and strange activities the happenings of their early years are fragmentarily revived. If immediate and remote repetition are related, then post-convulsive repetition has a twofold significance: firstly, since repetition is a normal feature of child behaviour, it indicates regression; and secondly, it is the surface sign of a fundamental neural process whereby the psychic and somatic past strives to repeat itself, and succeeds in doing so, to a greater or less degree, when the higher cerebral functions are in abeyance.

(d) *Retrograde Amnesia*

It will, I think, be generally agreed that every therapeutic fit is followed by a retrograde amnesia. A quarter of an hour after a fit the patient has no recollection of the therapeutic preliminaries, although he is able to recall earlier events, and, speaking quite generally, the more remote the event the easier it is to recall. Recovery from the amnesia follows much the same general principle, viz., earlier memories are recovered before more recent ones. All this is in keeping with the theory of regression, for together with the reactivation of the past one would expect a simultaneous dimming of the present. It is interesting to note that recovery from the amnesia can be hastened by prompting,

and if the patient be reminded of any particular incident which occurred shortly before the fit, all the other circumstances are likely to return to him in a flash. The memories are there but are difficult of access. A few hours after the fit normal memory is apparently restored, although it is possible that special testing would reveal minor residual defects. With the repetition of the fits very considerable disturbance of memory is likely to arise, but we are here dealing only with the effect of the individual convulsion.

SUMMARY

A variety of evidence has been considered which suggests that the convulsive process involves a recapitulation of former behaviour patterns and modes of thought. In the somatic field we find that the therapeutic fit is ushered in by a start, or series of starts, which resemble the Moro reflex of infancy, or a modification of it. The start is followed by tonic and clonic spasms, which have been compared to the "sustained" and "jerky" movements described by Barcroft as occurring in the developing sheep foetus. In the latter these movements become inhibited as development proceeds, but under the influence of asphyxia they can be reactivated in the reverse order to that in which they were evolved. It is suggested that during the dissolution of the therapeutic convulsion a similar process of reactivation of foetal movements occurs. Comparison is further made between the decerebrate rigidity noted by Barcroft in the sheep foetus and that which arises in the human convulsion, and attention is called to the fact that infants born prematurely tend to show signs of decerebrate rigidity.

After the termination of the convulsion, but before consciousness shows any signs of returning, certain behaviour patterns appertaining to infancy may be observed. They include sucking movements, the performance of various antics, and babyish crying. The regressive character of this behaviour is very impressive.

Later in recovery, when it becomes possible to establish some sort of rapport with the patient, there are signs of aphasia, a symptom in which Head and others have recognized elements of regression. In speaking, reading and writing the post-convulsive aphasic partly reverts to the methods of childhood. Moreover, in the domain of writing the material written may indicate that in certain respects the patient is living in the past. Former addresses are substituted for present ones, and where the name has been changed the older one is given in preference to the one which is more recent.

The same tendency to slip back into the past continues to be displayed throughout the whole period of recovery, but in the later stages the regression does not necessarily extend back to childhood; only a few years may be involved. Thus, the patient is liable to give his age as less than it is, to price cigarette cartons at their pre-war cost, to think he still has his own teeth when he is in fact edentulous, to believe that his hair is black when it is grey, and to deny that he needs spectacles for reading. These findings are by no means invariable, but the fact that they occur frequently justifies their inclusion as contributory evidence of regression.

Although in many respects the patient is living in the past, he is also to a certain extent living in the present. This sometimes leads to a fusing of psychic material, so that composite formations appear. For instance, descriptions of the present war may be distorted by the inclusion of circumstances of the last one; or the doctor may be identified with persons who in the past exercised authority over the patient. However, this telescoping of psychic material is not confined to the merging of the remote past into the present, for, as a result of perseveration, the immediate past can also impose itself on succeeding events. For example, a word written or spoken a short time previously may reappear and fuse with another word to form a neologism; or a movement recently performed may intrude upon and modify a later movement.

Repetition and perseveration, in some form or other, are almost invariable features of the post-convulsive state. The phenomenon may be exhibited at the reflex level in the form of a sustained or repetitive type of knee jerk. Later in recovery purposeful movements become implicated, and, as a result, an action which has achieved its object may continue to be rhythmically performed. Still later, repetitive movements give place to repetitive or fixed ideas of varying degrees of complexity. In every aspect of psychosomatic functioning this tendency to repeat is liable to present itself. But repetition is also a characteristic of infantile thought and behaviour. The child's first words consist of reiterated syllables, and later there is babbling; moreover, much of the play of infancy and childhood is associated with repetition. Freud noted this feature of the behaviour of children, and from it, as well as from other evidence derived from psychoanalytic experience, he came to the conclusion that the *compulsion* to repeat was a basic characteristic of primitive instinct. The suggestion is, therefore, made that post-convulsive repetition has a twofold significance: firstly, since reiteration is a normal mechanism of childhood, it indicates regression; and secondly, it can be regarded as the surface sign of a fundamental neural process whereby the psychic and somatic past strives to repeat itself, and succeeds in doing so when the higher cerebral functions are in abeyance.

Finally, in the post-convulsive state there is retrograde amnesia. There is total loss of memory for events

which have immediately preceded the fit, and partial loss of memory for earlier events. During recovery from the fit events which are more remote in time are remembered before more recent happenings. This disturbance of memory is claimed to be in harmony with a theory of regression.

CONCLUSION

Such is the evidence which suggests that the therapeutic fit involves a process of recapitulation in both psychic and somatic spheres. Can we detect in this regression an element of biological purpose? The primary function of the brain is to enable the individual to adapt to his surroundings, and it may well be that the psychosomatic phenomena of the convulsion represent a rudimentary attempt at such adaptation in the face of overwhelming difficulties of adjustment. Although at the onset of the fit the environment is making no excessive demands on the individual, the latter's powers of adjustment are being seriously hampered by the action of the convulsing agent; the situation is, therefore, much the same as if an external emergency had suddenly arisen to which adaptation was extremely difficult. Since in ordinary life we react to sudden emergencies in terms of past experience, supplemented if necessary by innate protective responses, it is not impossible that the psychosomatic manifestations of the convulsion may reflect the operation of a similar mechanism in crude and exaggerated form. Viewed from this standpoint the convulsive process is directed, albeit remotely, towards survival.

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THE NEUROPSYCHIATRIC ASPECTS OF PORPHYRIA*

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Little attention has been accorded the subject of porphyria in standard textbooks, although the syndrome has been known for many years. The disease has protean manifestations involving many of the organ systems of the body, but the chief signs and symptoms are so often of purely neuropsychiatric nature that they can well bear emphasis from this point of view.

Porphyria is a familial disease characterized by an abnormality of pigment metabolism which results in the excretion of unusually large amounts of porphyrins and other pigments in the urine. It is not the purpose of this article to delve at length into the various biochemical problems involved in the study of the abnormal pigments, nor to discuss in detail the signs of the disease other than those of neurologic and psychiatric nature; several comprehensive reviews of these matters are already available (10, 20, 8, 6, 7, 17, 12, 18).

For clinical purposes it is advisable to bear in mind that porphyria manifests itself in three chief forms. In the congenital form, appearing in early infancy and more commonly in males, the outstanding lesions appear in the teeth, bones and integument; the cutaneous lesions, known to the dermatologist as hydroa aestivale or hydroa vacciniforme, are referable to the photosensitizing properties of the porphyrins. In the acute idiopathic form, usually arising in the early decades of adult life and more frequently in females, the outstanding signs and symptoms are referable either to the abdominal viscera or to the peripheral, central and autonomic nervous systems. The acute toxic porphyria is resultant upon the use of various sedative drugs, such as the barbiturates, veronal and trional, or other toxic agents, and presents a clinical picture similar to that of the acute idiopathic type.

It is the contention of Günther (8) that congenital and acute porphyria occur in individuals who have a constitutional anomaly of pigment metabolism. Since he believes that the constitutional diathesis differs in the two forms, he has designated the abnormal basis of congenital porphyria as "porphyrosis," and that of acute porphyria as "porphyrism." Among the qualities of the recessive porphyrosis, he mentions a "neuropathic constitution" characterized by ready irritability, and amongst the stigmata of porphyrism, nervousness, psychic depression and insomnia. While the familial occurrence of porphyria undeniably supports Günther's views, Waldenström (17) first stated, "The lack of positive evidence makes it necessary to leave the question of the hereditary constitutional liability to acute porphyria to the future." However, in a subsequent communication (18), he felt inclined to look upon acute porphyria as a constitutionally determined reaction of the organism to various known or unknown noxious agents, and again stated (19), ". . . . there is an exquisitely chronic constitutional disorder in the metabolism of certain pyrrhole compounds." He further adds (18) that, since congenital porphyria is never seen in families with acute porphyria, the two diseases are not to be looked upon as forms of the same anlage. According to Nesbitt (12), "Acute porphyria differs fundamentally from congenital porphyria in that it is possibly inherited as a mendelian dominant . . . .," a view held by Waldenström (19). In any event, it is the constitutional anomaly which is held to be responsible for the occurrence of cases of so called "latent" porphyria, in which individuals excrete abnormally pigmented urine containing large quantities of porphyrin over long periods of time, without presenting other clinical signs or symptoms of the disease. These considerations make doubly interesting the occurrence in one of the cases (Case No. 3) herein reported, of an attack of acute porphyria superimposed on what appears to have been congenital porphyria. Equally provoking is the problem of whether or not certain types of emotional conflict play a rôle in precipitating attacks of acute porphyria, and whether specific personality characteristics occur with some degree of regularity amongst patients who suffer attacks of acute porphyria. Psychosomatic medicine is now replete with instances in which emotional factors influence the course of metabolic disorders, and there is some evidence in the cases reported below that such emotional factors play a part in the pathogenesis of acute porphyria.

Outstanding amongst the neurologic signs of an attack of acute porphyria are pareses and paralyses. Many reports (10, 20, 12, 2, 11, 13, 14) emphasize the frequent occurrence of the ascending or Landry's type of paralysis, with frequent exitus in respiratory failure. However, observations in the cases reported below indicate that this is not the commonest type of paralytic phenomenon in acute porphyria, and Waldenström (17, 18, 19) has stressed the fact that all parts of the striated musculature may be affected

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in irregular sequence. In the presence of widespread impairment of motor function, the great rarity of reported cases with sensory deficit is quite striking, although paraesthesias (4) do occur. Waldenström (18) says that in the great majority of cases sensibility is completely intact, and that only in cases where the symptoms have been of long duration has he been able to observe unequivocal diminution of superficial and deep sensibility. Nesbitt and Watkins (11) reported a case in which there was hyperaesthesia over the upper and lower extremities; Waldenström (17) reported two cases, in one of which sensibility for pain was disturbed on the trunk and extremities, and in the other marked impairment of sensation for all modalities occurred in the legs, but not in the upper limbs. Günther (6) says that disturbances in sensibility have been observed several times in acute, toxic hematoporphyria, and he quotes Bresslauer who mentioned violent pains in the legs, Schaeffer, paraesthesias, Bampton, lancinating pains in the legs, numbness of the lower limbs and perineum and finally widespread anaesthesia, and Geill, who observed total anaesthesia in trional intoxication. The abdominal pains, vomiting, constipation and signs of paralytic ileus have been thought by some to be determined by changes in the ganglion cells of the abdominal, autonomic ganglia (10, 20). The temporary or protracted attacks of amaurosis, in explanation of which no lesion can be found in the peripheral or central, visual apparatus, are most impressive.

Pathologic changes at autopsy in cases of acute porphyria are most consistently found in the nervous system. As reported in the literature (10, 17, 12, 2, 13, 9), they may be summarized as follows: there are parenchymatous, degenerative changes in the peripheral nerves, degenerative changes in the cells of the sympathetic ganglia, the anterior (and to a less extent, the posterior) horn cells of the spinal cord, the Purkinje cells of the cerebellum and the cortical cells of the cerebrum. The changes are more marked in the peripheral nerves and in the lower segments of the central nervous system, than in the higher segments.

The pathophysiologic processes in porphyria have at times been considered to be due to the property of the porphyrins of producing spasm of smooth muscle (12). Watson (20) says, "The application of very dilute solutions of various porphyrins to an exposed loop of bowel is said to result in a prolonged spasm intractable to atropin. Intestinal colic, as well as vasospastic sequelae such as hypertension, oliguria, spasm of retinal vessels and even peripheral neuritis, are regarded by some authorities as 'porphyrinopathic' phenomena. . . . ." Waldenström (19) explained the transient amaurosis as angiospastic in origin; in one of his cases an increase in blood pressure occurred at the same time. The signs of ileus have been attributed to vascular spasm in the intestinal wall; Schie (15) quotes the case of Boman in which at laparotomy "an ischaemic patch was first seen on the intestine, after which there was a spastic contraction followed by dilatation." The peripheral neuropathy of porphyria has been ascribed to changes in the nutrient vessels to the nerves, with resultant impoverishment of blood supply, but as Eldahl (4) and Waldenström (18) point out, this theory can scarcely be entertained in view of the fact that it is usually the motor fibres alone that are damaged, the function of the sensory fibres being well preserved.

There have been cases of acute porphyria which, during life, showed loss of motor power, and yet autopsy revealed no demonstrable lesions of the central or peripheral nervous system (2). Although neuropathologic changes are present in the majority of cases, their absence in some instances, and the unusual nature of the paretic and paralytic phenomena, have led to attempts to explain the neurologic dysfunction on other grounds. In a case reported by Waldenström (17), in which there was paresis of practically all the muscles of the trunk and extremities, but in which there seemed to be no complete paralysis, it was observed at autopsy that only minute amounts of blood pigments could be extracted from the pectoral and intercostal muscles, and that the muscles were very pale. Waldenström (17, 19) therefore suggests the possibility that a severe disorder in the metabolism of myoglobin may be responsible for the excretion of porphyrin and the impaired function of the muscles.

Many patients suffering from acute porphyria are admitted to psychiatric hospitals. It is, of course, obvious that a psychosis of the organic reaction type may well make its appearance in those cases in which there has been organic cerebral damage, either as a result of the metabolic disturbance or because of the degenerative changes in the nervous parenchyma. In such cases there are also likely to be convulsions and signs of focal lesions. Waldenström (19) says that manic-depressive and schizophrenic psychoses appear to be relatively common in families in which acute porphyria occurs, but there is as yet no statistical corroboration of this impression. A more subtle psychiatric problem arises in cases of acute porphyria in which there is no gross, organic damage to the brain. These cases are frequently considered to be instances of conversion hysteria, an impression which is fostered by the unusual abdominal complaints, the peculiar distribution and mode of onset of the paralyses, the

transient attacks of amaurosis, etc., as well as by the general demeanor of the patients. This is the result of making the diagnosis of hysteria by the exclusion of other, well known, organic syndromes, rather than by the use of positive criteria. Waldenström (18) says that, despite their hysterical appearance during attacks of acute porphyria, these patients, with few exceptions, do not give the impression that they have neurotic disorders when examined in the intervals between attacks. This statement is in conflict with the evidence derived from the present study (see below).

It is well known that in both the congenital (5) and acute (9) types of porphyria, the amounts of porphyrins and other pigments in the urine vary greatly from time to time. The abnormal color of the urine usually disappears with the subsidence of an attack of acute porphyria. It is not the porphyrins alone which are responsible for the unusual color of the urine, since it is altered very little by complete extraction of the porphyrins. (18). Various other pigments, which have not as yet been definitely identified, but which are said to include melanin, skatole, urofuscin and urobilin (9, 16), contribute to the unusual appearance of the urine. The diagnosis of porphyria must not be discarded merely because the freshly voided urine is of normal color, since, as Waldenström (19) has pointed out, the pigment may be present in the form of a colorless chromogen; if the urine is brought to a very acid reaction or allowed to stand, typical uroporphyrin will make its appearance. Moreover, instances have been reported (15, 1) in which the clinical syndrome of acute porphyria has not been accompanied by the presence of porphyrin nor the colorless porphyrinogen in the urine, the so called "porphyria without porphyrinuria"; in these cases the urine may or may not have an abnormal color. It is, accordingly, obvious that there is, as yet, no clear understanding of the metabolic disorder in porphyria, and that, in the diagnosis of the disease, chief emphasis should be placed on the clinical syndrome for the time being, with subsidiary aid coming from biochemical investigation.

Case Reports

Case 1. A white female, aged 35 years, was brought to Bellevue Psychiatric Hospital on June 6, 1942, because of her uncooperative behavior in another hospital. She complained of severe pain in the lower abdomen, generalized weakness and inability to move her limbs, and stated that her urine had been of dark red color for the two months prior to her admittance to the hospital. On the night of her entry she complained that she was unable to see, but subsequently did not voice that complaint again. She had intermittent, severe pains in the upper and lower extremities. She had had epileptic seizures since eight years of age, and for a number of years had taken phenobarbital; more recently she had taken dilantin in addition, both in unknown quantities. She had had no seizures in the last 15 months.

Psychiatric examination revealed the patient to be drowsy and confused. Her speech was slurred and there was some perseveration. She was emotionally unstable, irritable, demanding and depressed. There were some defects in recent memory and disorientation in time. She gradually became more and more confused, experienced auditory and visual hallucinations, and showed marked clouding of consciousness. The psychosis was that of an acute organic reaction type with the features of a delirium.

The pertinent findings on physical examination were the following. The patient was somewhat emaciated and of sallow complexion. There was a curvature to the right of the thoracic portion of the vertebral column. The blood pressure was 130/100. There was tenderness throughout most of the abdomen, but no rigidity. The liver was palpable one cm. below the costal margin in the mid-clavicular line. The uterus was enlarged and hard, apparently due to fibromyomata.

Neurologic examination revealed the following facts. The right pupil was larger than the left, and both reacted well to light. There was a left internal rectus weakness, which was not of recent onset. There was generalized weakness, without paralysis, of the musculature of the extremities. She had several generalized convulsive seizures while under observation. All of the deep tendon reflexes were absent, with the exception of the ankle jerks, which were equal and fairly active. There were no sensory disturbances. There was a fluctuating tachycardia, the pulse rate varying from 80 to 120 beats per minute. There was also severe diarrhœa.

The urine was of port-wine color during the first 16 days of her hospital residence. It contained urobilinogen, but no blood. Dr. Konrad Dobriner examined the urine and found it to contain an abnormally high concentration of porphyrins, especially the non-ether soluble fractions. The blood and spinal fluid Wassermann tests were negative; the colloidal gold test gave a normal result; there were no white blood cells in the spinal fluid, and the Pandy test was negative.

On July 3, 1942, the patient developed lobar pneumonia in the right lower lobe, and died on July 6th.

It is quite probable that this attack of acute porphyria was of the toxic type, secondary to the use of phenobarbital and dilantin.

Case 2. The patient was a 25-year-old, white female, who was brought to Bellevue Psychiatric Hospital on February 27, 1942, 12 days after an elective herniorrhaphy had been performed at another hospital. The youngest of her three children had been delivered 16 months earlier by Caesarian section, and a ventral hernia had appeared at the site of operation and grown progressively larger. There had been no signs of intestinal obstruction, and no abdominal pain prior to her last operation. The herniorrhaphy was performed under spinal anaesthesia. Immediately thereafter her urine exhibited a port-wine color which had never been present before that time, and she complained of severe

pain in the hypogastrium. Because of this pain, she became very noisy and agitated.

Psychiatric examination revealed the patient to be alert and cooperative, but very restless and excited. She complained of sharp, abdominal pain, and asked repeatedly for relief. She was emotionally unstable, tearful and depressed. She described herself as very nervous, and attributed this to the fact that her husband frequently beat her while intoxicated. According to her aunt, the patient was ordinarily pleasant and affable, but given to violent crying spells when reprimanded or when she found herself in a disagreeable situation. The sensorium was clear, and the patient appeared of low average intelligence. The psychiatric diagnosis was that the patient was of hysterical personality type.

On neurologic examination it was found that, at first the cranial nerves were all normal, but a week after admission a divergent strabismus appeared. Motor power of the voluntary musculature was quite good during the early part of the illness, but weakness of the muscles of the extremities soon appeared and became progressively worse, although there was no complete paralysis. The biceps jerks, triceps jerks and ankle jerks were all present and equal on the two sides, whereas the knee jerks were absent; one week after admission none of the deep tendon reflexes could be elicited. At first she complained of numbness in the lower limbs, and later of pain in the thighs; sensation for all modalities was normal.

The port-wine colored urine was examined by the spectroscopic method, and was found to contain greatly increased quantities of coproporphyrin, and a trace of uroporphyrin.

The patient developed hypostatic bronchopneumonia and died on March 11, 1942. The neuropathologic report (Dr. Lewis D. Stevenson) gave the following information. Sections through the spinal cord stained by Nissl's method showed the anterior horn cells and the other cells of the gray matter to be well preserved and normally stained. Sections stained with hematoxylin and Sudan 4 showed an increase in the amount of lipochrome in the anterior horn cells. There was also a small amount of fat in the ependymal cells of the central canal. There was no increase in the number of astrocytes in the gray matter of the cerebral cortex. Trichrome stained section through the cortex showed some subarachnoid hemorrhage and a few perivascular hemorrhages.

Case 3. The patient was a 19-year-old, white female, who was brought to Bellevue Psychiatric Hospital on May 12, 1943. For three months she had complained of abdominal pain, which at first was localized in the epigastrium, but soon spread throughout the entire abdomen, and was accompanied by vomiting. At the time of onset of the abdominal pain, the urine assumed an unusual, reddish-brown color which persisted until the time of the patient's death. A year earlier she had had a similar attack of epigastric pain and vomiting. During the two weeks before her admittance to the hospital, the patient had complained of progressively increasing weakness of the upper and lower extremities, and she had also had an attack of complete amaurosis, lasting only a few days. Her voice had assumed a high-pitched, weak quality. She had always been markedly constipated, but this complaint had become exaggerated with the progress of her illness.

At six weeks of age the patient had the first of a series of attacks of a cutaneous eruption diagnosed as eczema, for which she required numerous admissions to the hospital, and which never completely left her. These attacks usually began in the summer months, with a pustular eruption of the forehead which soon became generalized. She did not begin to walk until she was seven years of age, and her mother attributed this to weakness ensuing from the prolonged periods in bed necessitated by the skin disease. In other respects her early development was not retarded, and there was no intellectual defect in later years. At two years of age she had an illness, diagnosed as chickenpox, which left her with several punched-out skin lesions of the face and about the waist. She had measles at two and a half years of age, and erysipelas of the face at 12 years. She had chronic blepharoconjunctivitis of many years' duration.

Psychiatric examination revealed a quiet and cooperative, but tired and listless patient, speaking slowly in a weak, high-pitched tone of voice. There was no abnormal mental content, but she dramatized her complaints, and at times was noisy and vociferous in her demands for aid. According to her mother, she had become nervous and moody in the preceding three or four months, prefering to remain by herself for prolonged periods, while neglecting her usual occupations. She had become very sensitive about the blepharoconjunctivitis, feeling that this would deter others from associating with her. She was on poor terms with her father, who was a shut-in, seclusive individual; and who paid little attention to the patient. She was considered to be of hysterical personality type.

Neurologic examination gave the following facts. The pupils were widely dilated, equal in size, and reacted very poorly to light and on convergence. The voice was of nasal, high-pitched quality. The cranial nerves were otherwise normal. There was almost complete flaccid paralysis of the musculature of the upper and lower limbs. The weakness was more marked in the upper than in the lower limbs, and more severe proximally than distally. She could move both feet with difficulty, and was barely able to raise her knees off the bed, but could not abduct, adduct or rotate the lower limbs at the hip joints. She was able to flex her fingers weakly, but could perform no other movements in the upper limbs. There were occasional fasciculations of the thenar muscles of the left hand. Sensibility was intact, but testing for pain sensation caused paraesthesias described as "burning." All the deep tendon reflexes in the upper and lower limbs were absent, with the exception of the ankle jerks, which were active and equal on the two sides. This state of affairs persisted for a few days, when it was determined that the ankle jerks had also disappeared. An interesting phenomenon was then observed, namely, that repeated tapping of the tendo Achillis resulted in the gradual appearance of the ankle jerk, which became progressively more brisk as the tapping was continued. This phenomenon of summation in the deep tendon reflex could not be elicited from any other muscles in this particular case. The abdominal reflexes were absent, but there were no other reflexes indicating damage of the

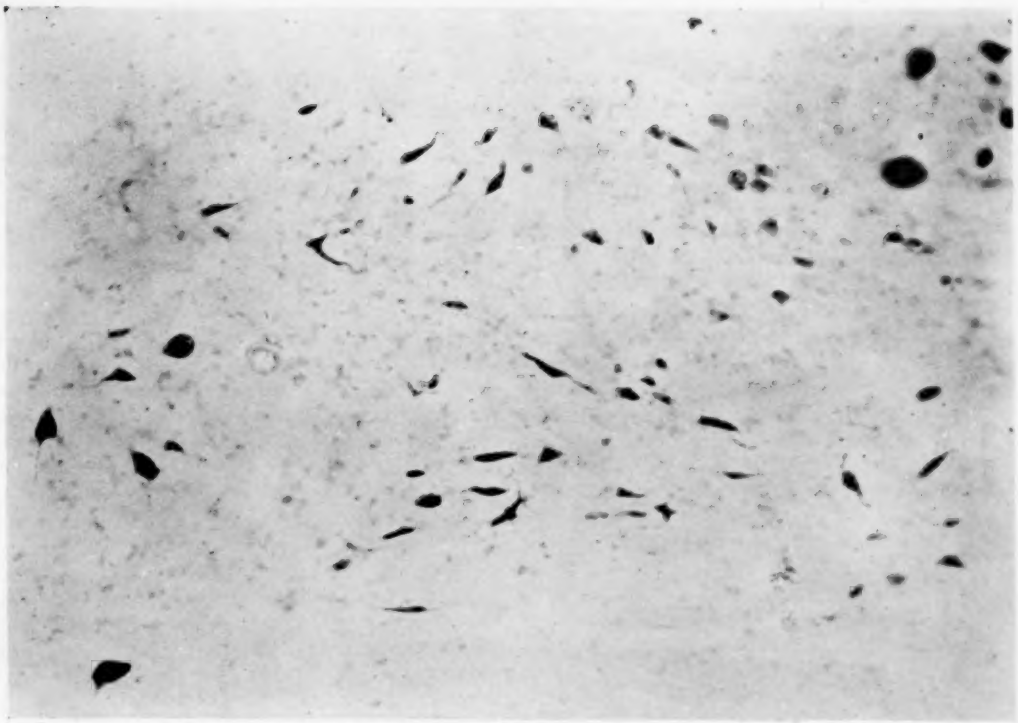

FIG. 1. Anterior horn in the thoracic region of the spinal cord, showing marked atrophy of the nerve cells with tortuous processes. Nissl stain. × 220.

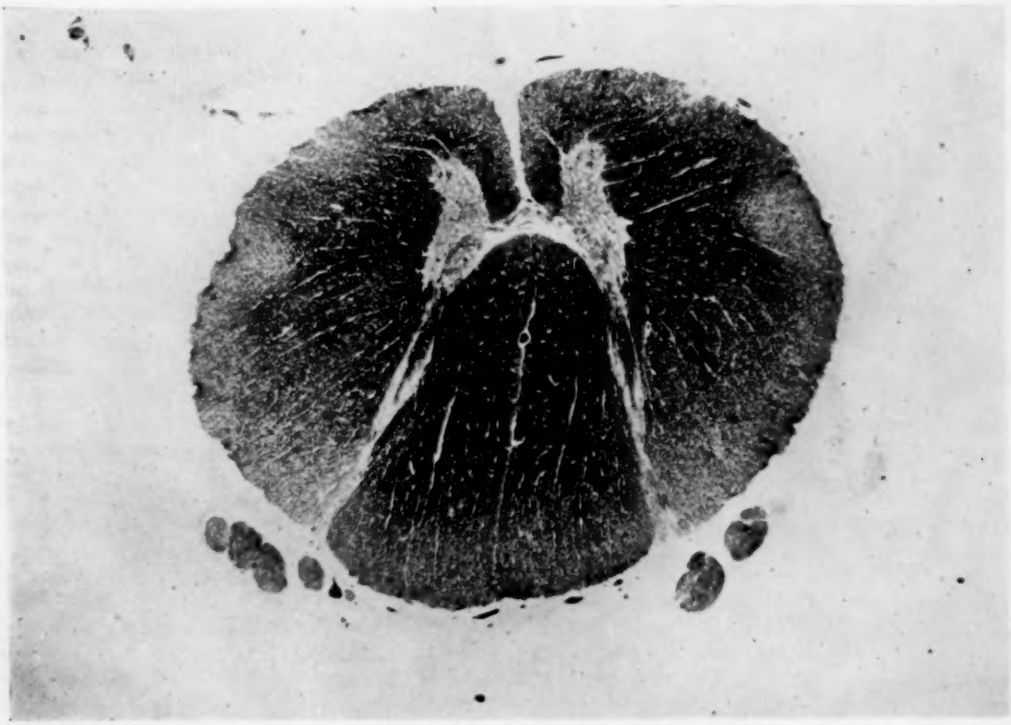

FIG. 2. Cross section of the thoracic region of the spinal cord, showing degeneration of the myelin sheaths about the periphery of the cord, particularly in the anterolateral columns. Myelin sheath stain. × 12.

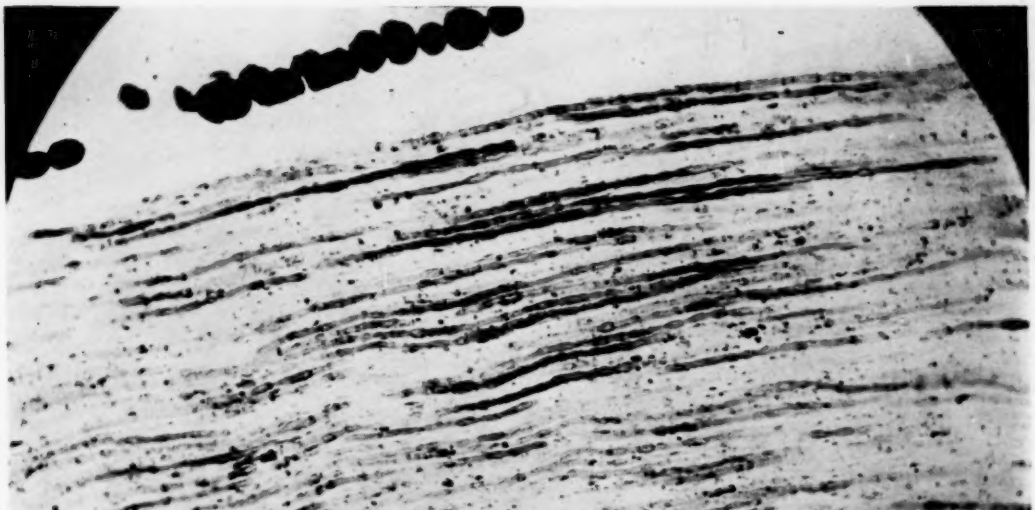

FIG. 3. Longitudinal section of the sciatic nerve, showing fatty degeneration of the myelin sheaths. Marchi stain. × 130.

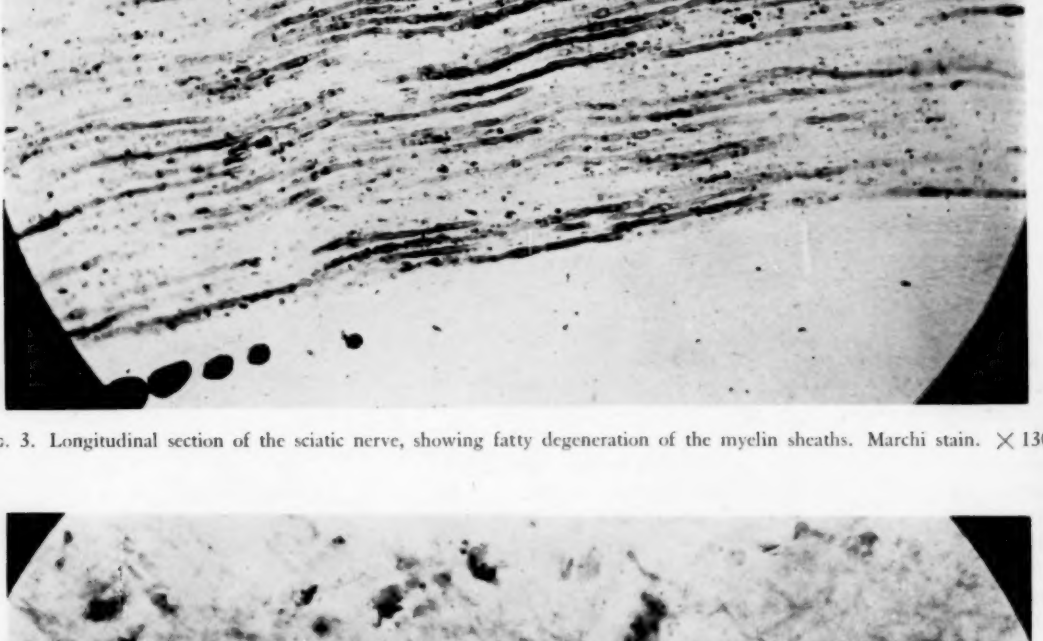

FIG. 4. Cerebral cortex showing excessive fat in the ganglion cells and about the capillaries (fat stains black). Hematoxylin and Sudan 4 stain. × 550.

pyramidal tracts. The blood pressure varied between 115/90 and 135/108. There was tachycardia, ranging between 96 and 130 beats per minute. An X-ray plate of the abdomen revealed moderate, generalized distension of all the coils of the large intestine, with no fluid levels.

The reddish-brown urine, when exposed to sunlight, darkened in color only slightly, but when heated with hydrochloric acid, turned a deep purple. The urine was examined under ultraviolet light for the typical fluorescence of the porphyrins, and also spectroscopically; it was found to contain excessive amounts of porphyrins, particularly coproporphyrin.

The patient died on May 20, 1943, apparently of respiratory failure, and autopsy was performed.

Gross examination of the brain and spinal cord showed slight sclerosis in the basilar artery, and some thickening of the arachnoid membrane at the base of the brain and over the spinal cord. There was congestion of the cerebral veins, and a small, subarachnoid hemorrhage over the right occipital lobe.

Microscopic sections of the thoracic area of the spinal cord, stained with Nissl's method, showed some loss of cells in the anterior horn, most of the remaining cells being atrophic, with dark staining of the cytoplasm, indistinctly outlined nuclei and tortuous processes (fig. 1). The cells in Clarke's column were better preserved than in other regions. Appropriately stained preparations showed an increase of fat in some of the cells of the anterior horn, Clarke's column and posterior horn; there was no fat seen in the white matter of the spinal cord. Sections stained with Hortega's silver carbonate stain showed astrocytes and glia fibres, probably in slight increase over the average. There was some loss of myelin in the spinocerebellar tracts (fig. 2).

Marchi preparations of the brachial plexus and sciatic nerve showed a definite parenchymatous neuropathy, perhaps a little more advanced in the sciatic nerve than in the brachial plexus (fig. 3).

The optic nerve, properly stained, showed no fatty degeneration of nerve fibres; with the Loyez stain for myelin sheaths, the sections appeared normal; a trichrome stained section was likewise normal.

Sections of the left superior frontal gyrus, stained by Nissl's method, revealed a fairly normal appearance of the nerve cells, although there were a few spaces from which some cells had apparently dropped out. Stained with hematoxylin and Sudan 4 for fat, there was seen to be a distinct increase in the amount of lipochrome in the cortical cells, and an increase of fat in the perivascular spaces of the gray matter (fig. 4.) Myelin sheath preparations of this area showed no deviation from normal.

Sections of the medulla, stained with Nissl's method, showed a normal appearance of the hypoglossal and vagus nuclei, and other cell groups. Sections of the dentate nucleus, appropriately stained, showed some increase of fat within the cells, and many droplets of fat within the structure of the nucleus.

Sections of the cerebellum were stained with trichrome, Nissl's stain and hematoxylin and Sudan 4 for fat. In some leaflets there was a moderate dropping out of Purkinje cells; those remaining, however, appeared to be well preserved. There was some increase in fat about the capillaries in the granular layer.

There was no evidence of inflammation in any of the sections.

The neuropathologic diagnosis was encephalopathy, myelopathy and parenchymatous polyneuropathy.

This case suggests the interesting possibility that here was a combination of some of the features of congenital porphyria together with those of acute idiopathic porphyria. It seems justifiable to relate the skin lesions, which the patient endured from early life, and particularly in the summer months, to the general metabolic disorder.

Case 4. The patient was a 29-year-old, white female, who was brought to Bellevue Psychiatric Hospital on July 23, 1942. During the preceding five years she had had three essentially similar attacks, all characterized by depression, insomnia, excessive fatigue, abdominal pain and paralysis of the upper and lower limbs. She was thought to be suffering from conversion hysteria, and had been given intensive psychotherapy. During the first of these attacks, an appendectomy had been performed, but the appendix was found to be "not acutely inflamed." She recovered and was able to return to work until December, 1939, when, following the death of an older sister, she complained of nausea, abdominal pain, fatigue and gradually increasing weakness of the upper and lower limbs. She again recovered, but on this occasion, she did not regain the full motor power of her hands, and thereafter was awkward in carrying out various manipulations. It was also observed at that time that there was atrophy of some of the small muscles of the hands. She improved sufficiently to get married and return to work, but at the end of June, 1942, she again began to complain of fatigue, depression and abdominal pain, and was finally admitted to the hospital. She had told her husband about two months earlier, that her urine was "very dark."

The elder sister, who died in December, 1939, and who was two years the patient's senior, had an illness which was described by the family as exactly like that of the present patient. For three months she complained of marked fatigue and abdominal pain, with the subsequent onset of paralysis (of unknown distribution). Her symptoms were considered to be of psychogenic origin, and she was treated by a psychiatrist, but she suddenly developed what was thought to be pneumonia and died within 12 hours of the onset of the respiratory complaints.

Psychiatric examination of our patient revealed her to be quiet, cooperative and alert, but it was very difficult to carry on a conversation with her, since she could speak only in a whisper and very slowly, being under the necessity of taking a breath after each word. Despite the gravity of her physical condition, her own complaints that she could not walk nor use her upper limbs, and the difficulty in speaking, she paid remarkably little attention to her somatic state. Rather she dwelt on her emotional problems, such as her conflict over the use of contraceptives, her concern over the husband's induction into the armed forces, and her financial problems. She was quite content in the hospital and smiled frequently. There was no abnormal

mental content, and no gross impairment of the intellectual faculties. Judging from the findings on examination, and from the reports of the psychiatrists who had seen her previously over a prolonged period of time, there could be no doubt that this patient had an hysterical personality.

The only abnormal findings on physical examination were a respiratory rate of 28 per minute, a pulse rate of 120 per minute, temperature of 104° F. and blood pressure of 140/100.

Neurologic examination revealed no abnormalities of the cranial nerves. There was marked weakness of the musculature of all four extremities. The limbs lay flaccid on the bed, and there was only slight power in the flexors of the wrists and fingers, and in the flexors and extensors of the ankle joints. There was marked atrophy of the thenar and hypothenar eminences of both hands. There were no fibrillations. All of the deep tendon reflexes and the abdominal reflexes were absent. Sensibility appeared to be intact. The patient was incontinent of urine.

The urine was of a clear, red color, and contained no red blood cells; the benzidine test was negative. The spinal fluid was normal in all respects.

The patient soon became deeply comatose and markedly dyspnoeic, and died on July 25, 1942. While the early death of the patient precluded adequate examination of the urine for porphyrins, the clinical and pathologic findings were altogether characteristic of porphyria.

Only a portion of the lumbar region of the spinal cord, and parts of the brachial plexus and sciatic nerve were available for neuropathologic study.

Sections of the sciatic nerve stained by Marchi's method and with Sudan 4 for fat, showed a marked, parenchymatous degeneration of the myelin sheaths. Preparations of the brachial plexus stained with Marchi's method showed a definite, parenchymatous neuropathy.

Sections of the lumbar area of the spinal cord, stained by Mann's method for myelin sheaths, showed no definite tract degeneration, although there appeared to be some thinning out of the myelin sheaths at the periphery of the cord in the spinocerebellar tracts. Sections stained by Nissl's method showed some slight, degenerative changes in the anterior horn cells, some of the cells being slightly atrophic and some having an increased amount of pigment. The cells were probably reduced in number. Sections stained with Sudan 4 and hematoxylin for fat, showed a marked increase in the amount of fat in some of the anterior horn cells, the cells in Clarke's column and some of the other cell groups. When stained by Hortega's method for neuroglia and microglia, this same area showed no deviation from the normal in these elements. Sections stained with the trichrome stain showed no hemorrhage or inflammatory reaction.

The posterior root ganglion stained by Nissl's method, showed changes in the ganglion cells, some having an irregular outline, and some showing early liquefaction necrosis. There was a considerable amount of pigment in some of the cells.

The neuropathologic diagnosis was myelopathy and neuropathy of the brachial plexus and sciatic nerve.

Case 5. The patient was a 32-year-old, white female, who was admitted to Bellevue Psychiatric Hospital on July 21, 1942. For about a year she had complained of pain in the lumbar region of the back, radiating to the scapulae, occurring chiefly at night, and for which no cause could be found. For two months she had experienced pain starting around the umbilicus, then becoming generalized throughout the abdomen, and at times accompanied by nausea and vomiting. She became restless and emotionally unstable, and threw herself about in bed; she complained of marked insomnia and asked repeatedly for sedative medication. Physical examination and X-rays of the chest and abdomen, done at another hospital, revealed no abnormalities, and it was the general opinion of the examining physicians, including a neuropsychiatrist, that the patient was suffering from a psychoneurosis. Later, on July 11th, the patient complained of diplopia and subsequently became quite somnolent.

Some ten years earlier, and soon after the death of an elder sister, the patient had had an attack of "indigestion" and vomiting, accompanied by backache. The appendix was removed at the time and found to be "not acutely inflamed," and the general opinion was that the cause of the patient's complaints was "just nerves." The sister, who died at the age of 23, had complained for some weeks of abdominal pain, which suddenly became severe, so that she was operated on with the diagnosis of intestinal obstruction. At operation, an ovarian cyst was said to have been found. Two weeks later the patient began to have generalized convulsive seizures. She was taken home and was then found to walk with a peculiar gait, and to stare in an unusual fashion; her personality changed, and she no longer wanted to talk very much or engage in any activities. Convulsions recurred and the patient died six months after the operation. During this last illness of the sister, her urine was described as being like "clear, dark red wine," and it is apparent that she died in an attack of acute porphyria.

On admission the patient was found to be in a deeply stuporous state; she subsequently passed through a delirium with visual hallucinations, clouding of the sensorium and disorientation, from which she recovered in about three weeks. Her personality structure showed hysterical features. Her father was a Prussian, who, in his family life, "thought that he was running an army," and beat the patient's brothers severely. The parents separated when the patient was 18 years of age. Her relations with men were certainly hampered by the pattern of her attitude toward her father. She had given up her male friends as unsuitable, and had developed a defeatist attitude, doubting that she would ever meet the right man. She felt that she was too old to have children, was too wrapped up in her family, and loath to leave her elderly, sick mother and divorced sister, with whom she lived. (Nearly two years later, when this patient did get married rather suddenly, she lived with her husband many months without completing the act of sexual intercourse; she knew that something was wrong in her sexual life, but was not quite sure what it was.)

The noteworthy facts on neurologic examination were the following. Hippus was present. The deep tendon re-

flexes were absent in the upper and lower limbs, with the exception of very active ankle jerks, which were striking in view of the absence of the knee jerks. There was no response to plantar stimulation. Within three or four days all the deep tendon reflexes reappeared, although their degree of liveliness varied, and for a time, the ankle jerks were the most active of all the reflexes. As the patient continued to improve, she complained of pain and weakness in the upper and lower extremities, and burning dysaesthesias. There was no impairment of sensibility.

The blood pressure varied from 182/118 to 126/84, and was usually above the limits of normal.

At the time of admission, and about five weeks later, the urine was of port-wine color; at other times, the color was not unusual. The abnormally colored urine was examined spectroscopically by Dr. Konrad Dobriner and found to contain a very high concentration of porphyrins, whereas the urine of normal color did not show an abnormally increased amount of porphyrins. The spinal fluid showed no pathological changes.

The patient made a complete recovery from this attack of acute porphyria, and was able to leave the hospital six weeks after admission. She has remained well since that time.

Case 6. A white female, aged 24 years, was admitted to Bellevue Psychiatric Hospital on October 12, 1943, after she had made a suicide attempt by drinking tincture of iodine. She had made this attempt on her life because of abdominal pain which had been present for a prolonged period, and from which she had been unable to obtain relief.

The birth and early development of the patient had been normal. At three years of age, while at a bathing beach and after having been exposed to the sun for a prolonged period, she suddenly had a convulsion, characterized by loss of consciousness and generalized, tonic contraction of the musculature. When she regained consciousness it was observed that she had a right, internal strabismus which persisted thereafter. In subsequent years, the patient showed great sensitivity to sunlight, necessitating the use of dark glasses and a wide-brimmed hat when out of doors; if exposed to sunlight for a prolonged period, large blisters made their appearance, but they healed without scarring. With the exception of a severe attack of pertussis at five years of age, she remained well until her sixteenth year. She was described as a shy, retiring, studious person, who had few female, and no male, friends; in her adolescent years she did not engage in the extracurricular activities of her classmates. At the age of 16, while in her last year of high school, she had a second convulsion, similar to the first. Thereafter she was blind for two months, and had to remain in bed or in a chair because of marked weakness of the lower limbs. During the course of this illness, she began to complain of abdominal pain, worse at the menstrual periods, and which never left her completely thereafter; all the physicians who examined her expressed the opinion that there was no organic disease to account for the pain. She recovered, to a large degree, from this attack, and after resting at home for about a year, she engaged in clerical work. In December, 1942, she left her position with the complaint that the men at her place of employment were teasing her with notes about girls giving birth to babies, and it then became apparent to her parents that she was mentally ill. She remained in bed a large part of the time, complaining of weakness of the lower limbs. She thought she had cancer of the stomach, said she was the Mother of God, and that she was possessed of the devil. She walked through the streets with a swaying gait, making peculiar signs with her arms. In March, 1943, she was committed to a private mental hospital, where she was resistive and uncooperative; she was given five electric shock treatments, without improvement in her mental condition. She was then paroled to her home, where she remained quite depressed, and finally made the suicide attempt which brought her back to the hospital.

The following facts in the family history are of significance. The paternal grandfather was an irritable alcoholic. A paternal aunt had been admitted to a mental hospital because of an involutional psychosis of paranoid type. A brother of the patient, suffering from catatonic schizophrenia, was given insulin shock treatment at a state hospital. This brother was examined for evidence of porphyria, but none was found.

Psychiatric examination of our patient revealed her to be alert, but irritable, evasive and very uncooperative. She stated that she had made her suicide attempt because of the persistent, abdominal distress which she had experienced for some years, and which she located in the epigastrium and in both hypochondriac regions. At times she described this as a pain, and at times as a feeling as though a large, foreign object were present in her abdomen. She paid little attention to, and never complained spontaneously of, the weakness of her upper limbs (described below), although this weakness interfered with activities such as feeding herself. Although she was evasive about her delusional ideas, she admitted those described by her parents. At times she voiced suicide threats, but she did not attempt to account for her death wishes. Psychometric examination gave her an intelligence quotient of 94 on the Bellevue Adult Intelligence Test, her verbal I.Q. being 106, and her performance I.Q. 83; there seemed to be a general falling off in intellectual functioning. It was impossible to fit the psychiatric picture in this case into any of the usual diagnostic categories, but in view of the intellectual impairment and the history of convulsive seizures, it appeared advisable to consider this as an organic reaction type.

Several other, pertinent facts of the case may be brought together here, The patient was well developed, except that she had a small head; she was obese and had striae distensae of the breasts. Over the posterior thoracic wall there were numerous yellow-brown, macular lesions, and acne of the face and back had been present for years. The blood pressure was 110/90. She had been constipated throughout her entire life, going four or five days without a bowel movement, unless she took a laxative. X-ray of the abdomen revealed no abnormalities.

The chief findings on neurologic examination were the following. The cranial nerves were normal, with the exception of a transitory, bilateral sixth nerve weakness.

Usually the right eye was turned in, with the cornea at the inner canthus, and the patient could move this eye outward only until the pupil was just past the middle line; at other times the left eye was turned in, with similar restriction of movement; at times both eyes could be moved freely through the normal range. There was very marked atrophy of the muscles of both hypothenar eminences and of the interosseous muscles of both hands. There were fasciculations in the muscles of the thenar eminences, where there was also some slight atrophy. There was marked weakness of the muscles which extend the wrist and elbow joints; the flexors of the wrists were rather weak, but those of the elbow joints were quite powerful. There was no demonstrable weakness in the musculature of the lower limbs. The deep tendon reflexes of the upper and lower limbs were very active and equal on the two sides. No abnormal reflexes were elicited. There were no sensory disturbances.

During the first few days of her stay in hospital, when the abdominal pain was quite severe, the urine was of dark brown color, and when acidified with hydrochloric acid and boiled, it turned a port-wine color. In the ensuing days, when the abdominal pain abated to some degree, the urine was of normal color. The urine collected during the first few days contained porphyrins in abnormally large amounts; it gave the characteristic absorption spectrum and the typical, orange-red fluorescence in ultraviolet light.

After six weeks the patient's condition showed no change, and she was committed to a state hospital.

It is important to recognize the clinical syndrome of porphyria, whether or not porphyrins are present in the urine, since, as pointed out above, the excretion of the pigment is not at all constant, and, indeed, may not occur at all. The following four cases represent instances of porphyria without porphyrinuria. In two of them the urine had an abnormal color at certain times, and in the other two this feature did not appear, but in none of them could porphyrins be detected. They demonstrate the necessity of recognizing the signs and symptoms without placing too much dependence on the finding of porphyrins in the urine.

Case 7. The patient was an 18-year-old, white female who was brought to Bellevue Psychiatric Hospital on September 20, 1942, from another hospital, after she had expressed suicidal threats. During the preceding few months the patient had been admitted to several hospitals on many occasions, because of essentially similar attacks of acute illness. She would suddenly fall to the ground, stating that she was unable to stand or walk, and at the same time would become completely blind. The blindness lasted from several hours to some days. She complained of pain in the lower abdomen and lumbar region of the back, often accompanied by nausea and vomiting. She was constipated and had marked strangury and urinary retention, so that catheterization had frequently been necessary. She stated that on several occasions her urine had been of a red color.

The patient's emotional life was a turbulent one, replete with chronic dissatisfaction. She was the youngest of three daughters, and got along very poorly with her parents and siblings. She felt that her social activities had been too rigidly restricted by her parents, and deeply resented the corporal punishment inflicted on her by them as late as her eighteenth year. She was blamed for her father's annually recurring asthmatic attacks. In order to escape the disagreeable home situation, she secretly married, in April, 1942, a man 12 years her senior. Since he was about to enter the armed forces, she continued to live with her parents, who did not learn of the marriage until informed of it some months later by a friend of the patient. At first she was frightened by sexual relations. She stated she knew nothing of the rôle of the male in procreation until she was 16 years of age, at which time she began her studies of biology in high school.

Thorough physical examination, laboratory and X-ray investigation revealed no organic abnormalities. During her prolonged period of observation in the hospital, the patient was often blind for varying periods of time, but no abnormality of the eyes could be detected on examination. An electroencephalographic tracing, taken with right and left occipital leads, showed that the alpha activity recorded when the eyes were closed, was replaced, when the eyes were opened, by irregular, disorganized wave forms with occasional fragments of alpha activity. It was apparent, therefore, that the occipital cortex responded to visual stimuli, although the patient was not consciously aware af a perceptual experience. Neurologic examination revealed two other factors of importance. On some occasions, the deep reflexes were found to be diminished, except for the ankle jerks, which were quite active. Our experience with other cases (Cases 1, 2, 3, 5, 8, 9 and 10) has led us to consider this a significant sign of porphyria. In addition, the patient was unable to distinguish letters and numbers written on her skin, which was apparently a functional disturbance.

The course of this patient's illness has now been followed for two years, and at no time have porphyrins been detected in the urine, although carefully searched for. The clinical picture continues unchanged.

Although no one can doubt that there are hysterical manifestations in this case, her chief complaints were those which constitute the clinical syndrome of porphyria without porphyrinuria.

Case 8. The patient was a 53-year-old, white female, who had been a sociable, active and efficient woman. In addition to being very religious, she was very modest and had been "shocked at the sexual side of marriage." In 1936, at the age of 46, the onset of increasing tenseness and restlessness was observed, until the symptoms of a frank psychosis made their appearance in 1940, so that she was admitted to a private mental hospital. She expressed delusions of reference and persecution, stating that neighbors talked about her in derogatory fashion, that automobiles followed her, and that people made insulting remarks about her sexual practices. She experienced auditory hallucinations, in which she heard the voices of members of her family on the radio, and olfactory hallucinations of very unpleasant odors. At times she lapsed into a stuporous, mute state. The course of this psychosis was punctuated by various somatic symptoms. She complained of

"nervous indigestion," poor appetite and nausea. At times she had abdominal pain, tenderness, distension and constipation, accompanied by fever up to 39.2° C. There was severe insomnia. She complained that she could not focus her eyes properly when reading, although thorough examination revealed nothing to account for this. She said that her feet were weak, and she walked with short, jerky steps; at times her legs buckled under her, but no organic cause for this could be found. The diagnosis of catatonic schizophrenia was made, and the patient was transferred to a state hospital, where, during January and February, 1941, she was given a course of electric shock treatments, with some resultant improvement in her mental condition. She was paroled from the state hospital on July 5, 1941. In October, 1942, the patient complained that she was blind, and injured herself on several occasions by walking into stationary objects. However, repeated examinations revealed no organic cause for the blindness, and several physicians considered it to be of hysterical nature. In July, 1943, she complained of abdominal pain and dysuria. At no time was the urine observed to be of abnormal color, although at the time of the last examination, the patient could not give an accurate history about this point. She was admitted to Bellevue Psychiatric Hospital on October 24, 1943, because of the recurrence of a mute, stuporous state.

Throughout the period of observation, which lasted one month, the patient was uncooperative and uncommunicative. She usually lay quietly in bed, with the covers drawn over her head, or sat upright in bed with her hair thrown down over her face. She did not obey any commands, nor did she reply to questions put to her. Occasionally she asked to go to the toilet or prayed to herself, but these were her only verbal productions. Sometimes she soiled the bed. She fed herself when eating utensils were placed in her hands; otherwise she paid little or no attention to her environment.

On neurologic examination, several important facts were observed. The patient was completely blind; she never fixed her gaze on an object, nor did she follow a light with her eyes, nor blink when an object approached her eyes rapidly. The optic fundi were normal, and there was no demonstrable lesion to account for the amaurosis. The pupils were slightly irregular in outline, but reacted to light; the patient did not converge her eyeballs. In other respects the cranial nerves were normal. There was generalized wasting of the musculature, but there were no paralyses of any of the large muscle groups. There was marked atrophy of both thenar eminences, and tapping of these muscles resulted in fasciculations which could not be elicited from other muscles. The deep reflexes in the upper and lower limbs were all very active and equal on the two sides of the body, with the exception of the knee jerks, which were absent on the first examination, although the ankle jerks were brisk. However, repeated tapping of the quadriceps tendons resulted in the eventual elicitation of the knee jerks which had previously been absent. Moreover, the phenomenon of summation was present, in that repeated tapping made the knee jerks more and more active, and it was apparent that with each successive blow, more and more of the muscle mass became involved in the reflex response. On other occasions, the previously absent knee jerks were not only found to be present, but they were quite brisk, so that the variability in the response was quite striking. The abdominal reflexes could not be elicited, but there was no Babinski sign. It was impossible to do a thorough sensory examination, but no evidence could be found of loss of sensibility.

The spinal fluid was normal in all respects. At no time during the month of observation did the urine have an abnormal color. Boiling the urine with hydrochloric acid, and testing by Garrod's (9) method, failed to reveal the presence of porphyrins.

In this case, various symptoms and signs suggested the diagnosis of porphyria, viz., the abdominal pain and dysuria, the peculiar weakness of the muscles of the lower limbs, the amaurosis, the bilateral thenar atrophy, and the absence of the knee jerks in the presence of the ankle jerks. Nevertheless, porphyrins could not be detected in the urine, and it appears advisable to include this case amongst those of porphyria without porphyrinuria.

Case 9. A 36-year-old, white, married female was admitted to Bellevue Psychiatric Hospital on November 6, 1943, when she made a suicide attempt by taking a large amount of phenobarbital. In her early years she had had many neurotic traits: she bit her nails, had temper tantrums and cried a lot; she was finicky about her food, and was afraid of the dark and of storms; she was timid, sensitive and shy. She was happier after her marriage at the age of 17, and had two children. About six years before the present illness, she had complained of pain in the knees, ankles and metacarpophalangeal joints; she could not rise from a chair, and said that her lower limbs were paralyzed. The illness was diagnosed as arthritis. Two years before the last admission to the hospital she began to complain of pain in the right upper quadrant of the abdomen and in the pelvis. In another hospital the diagnosis was made of retroversion of the uterus, chronic appendicitis, chronic cholecystitis and common duct obstruction. In July, 1943, cholecystectomy and appendectomy were performed, and three weeks later the common duct was drained at operation and adhesions freed. After her return home, she found herself to be irritable and argumentative. The members of her family annoyed her, and after a period of stress, she made the suicide attempt which necessitated her admittance to Bellevue Hospital.

Psychiatric examination revealed a state of irritable weakness with some depression; the diagnosis of neurasthenia was recorded.

Of interest in physical examination was the marked tenderness of the calf muscles and of the ankle joints on palpation, although there was no evidence of inflammation in the joints. X-rays of the hands, wrist and ankle joints revealed no abnormalities.

Neurologic examination revealed the following facts. There was bilateral thenar atrophy, with weakness and fibrillations of these muscles. With the exception of the knee jerks, all of the deep tendon reflexes were very active, and there was unsustained ankle clonus. On many examinations the knee jerks were found to be absent, but this was

variable, and occasionally they were quite brisk. However, when they were absent, repeated tapping of the quadriceps tendons resulted in their appearance, and as the tapping was continued, they became more active.

Several examinations of the urine by various methods failed to reveal the presence of porphyrins. The appearance in a neurotic woman of vague abdominal pains which defied diagnosis for a prolonged period, the history of an attack of paralysis of the lower limbs, the bilateral thenar atrophy and the absence of the knee jerks in the presence of the ankle jerks, all suggest the diagnosis of porphyria without porphyrinuria.

Case 10. The patient was a 20-year-old, white female, who entered Bellevue Psychiatric Hospital on February 15, 1944. For some months she had experienced recurrent attacks of sharp pain in the left lower quadrant of the abdomen, accompanied by nausea. These attacks became more severe after the death of her mother on December 19, 1943. After that date she had difficulties with her stepfather, which caused her much distress, and she suffered severely from insomnia. For a few days the abdominal pain recurred more frequently and was more severe, and she had several bouts of vomiting. She finally lost consciousness, and was admitted to the hospital.

Of interest in the past history of this case is that, when the patient was five years of age, and during the summer months of the year, she was taken ill with a sickness which could not be accurately diagnosed. In addition to the symptoms of a common cold and sore throat, she suddenly became completely blind, the amaurosis persisting for six months, after which she recovered her vision.

The abdominal pain subsided shortly after her admission to the hospital, although there were mild, recurrent attacks for some weeks thereafter. Thorough physical, X-ray and laboratory examination failed to reveal any organic, pathologic changes to account for her complaints.

Aside from astigmatism and hyperopia, the eyes were normal. The only finding on neurologic examination which was of special interest was the variability in the activity of the deep tendon reflexes. At times these were brisk, at other times their activity was much diminished; sometimes they were unequal on the two sides of the body; sometimes those in the upper limbs were more active than those in the lower, and vice versa.

Psychiatric examination revealed the patient to be of hysterical make-up. She was dramatic in her complaints. She stated that she had never been able to stand the sight of blood, and at 14 years of age, she fainted when her mother had epistaxis. When a venipuncture was done, she felt very faint, had cold perspiration on her face, and a weak, thready pulse. She had planned to marry a man she had known for more than three years, but stated that his advances to her never aroused any sexual desire on her part. She feared that sexual relations would be very painful, and she dreaded the prospect of childbirth. She finally broke off her relation with this man over a trivial matter, and was much relieved thereby.

Exhaustive tests never revealed the presence of porphyrins in the urine.

The occurrence of attacks of abdominal pain and vomiting in a hysterical girl, who had had an attack of blindness, together with unusual variability of the deep tendon reflexes, lead to the diagnosis of porphyria without porphyrinuria.

COMMENT

A review of the case histories outlined above reveals that, in addition to the features of the syndrome of acute porphyria which are already well known, there are others which require emphasis.

The disease occurs with special frequency, if not exclusively, amongst people with severe, neurotic personality disorders. The patients usually appear to be hysterical, except in those instances where organic brain disease clouds the underlying features of the personality. It is probable that the psychoneurosis plays an important part in the pathogenesis of the disease, and in determining the time of onset of the acute attack. Thus, Eldahl (3) has reported a case of acute porphyria in which a psychic insult was thought to have been the releasing factor.

In seven of the ten cases reported here, there was a history of major psychosis or serious personality deviation in one or more members of the last three generations of the family. In two of the remaining three cases, there was no opportunity to enquire into the family history, so that the incidence of mental disease amongst the relatives of these patients may have been even higher. It is obvious that porphyria occurs in families in which psychiatric disorders run rife.

The peculiarities of the deep tendon reflexes constitute a striking feature of the symptomatology of the acute attack. Other authors (14, 47) have reported cases in which the ankle jerks were present, while the knee jerks were absent, but the frequent occurrence of this sign has not been sufficiently stressed. The fact that the absent reflexes may frequently be elicited if the tendon is repeatedly tapped should be borne in mind, while the phenomenon of summation, in which the reflexes become progressively more active as the tendons are struck, is a distinguishing feature of this disorder. Another peculiarity of the reflexes is their great variability, the degree of their activity varying much from time to time.

Once the porphyrinopathic polyneuropathy and degenerative changes in the anterior horn cells have set in, the small muscles of the hands appear to be affected early and with great frequency.

The diagnosis of porphyria without porphyrinuria should be kept in mind in those cases in which the clinical signs and symptoms of the syndrome are not accompanied by the presence of porphyrins in the urine.

SUMMARY

The neuropsychiatric features of porphyria, together with the neuropathologic processes, are outlined. Ten cases histories, three with the neuropathologic findings at autopsy, are given; of these, six are cases of porphyria and four of porphyria without porphyrinuria. Certain features of the neuropsychiatric symptomatology are emphasized.

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REPORT OF THE ROCKEFELLER FOUNDATION FOR 1944

The following excerpts from *The Rockefeller Foundation, A Review for 1944,* by Raymond B. Fosdick, may be of interest to the readers of this journal.

During the past 22 years, the Foundation has spent $14,000,000 for the advancement of psychiatry, or three-quarters of their allotment for work in the medical sciences. At first, attention was given to the improvement of methods of teaching in psychiatry; second, the support of research centers; and third, the present phase, to the development of personnel.

Because of the military emergency, there is an urgent necessity to provide postwar training of medical graduates who were unable to finish their prewar training. In December 1943, the Foundation appropriated $320,000 to provide for this contingency. In 1944, an additional $188,000 was appropriated. The new fellowship program has been initiated to enable the 21 leading medical schools to offer residencies to the men who will become "the teachers of the next generation."

In a survey by the National Research Council, it was discovered that, by the end of 1945, there will be 2,700 men in the field of the natural sciences who have been prevented by the war from taking doctorates. The Foundation gave to the National Research Council, in 1944, $335,000 to provide between 125 and 200 fellowships. This will insure the further training of 8 per cent of the ablest members of this group.

A STUDY OF HOMOSEXUAL ADULT MALES

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In view of the widespread opinion that homosexual behavior is related to an abnormality in sex hormones, it is surprising that such a few reports of investigation on this point have been published. In the most recent report Myerson and Neustadt (5) discuss the subject from several aspects and provide an adequate bibliography and review which will therefore not be added to at this point. These authors are in fundamental agreement with the several reports from Wright (2, 7, 8, 9, 10) and his collaborators in finding that the commonest endocrine pattern in male homosexuals is a relative increase in urinary estrogens and decrease in androgens. Both groups agree that this is not always an absolute increase or decrease. Also Myerson and Neustadt recognize the shortcomings of studies of the urinary hormones because these are excretory products only, and also because they include excretory products from other sources than from the gonads. Both groups have felt that this was at least one objective method of approach which was possible at the time. The conclusions of Wright and his collaborators have been challenged by Kinsey (4) particularly as to statistical conclusions, based on observations with a wide range of fluctuation in values. Inspection of the data is nevertheless highly suggestive that there is some type of endocrine disturbance in these atypical adult males.

It occurred to the authors that there was an opportunity to look for evidence of an endocrine disturbance in the series of homosexual soldiers who were under observation of one of us for diagnosis.

METHOD OF STUDY

During the period of necessary hospital examination for the establishment of this diagnosis, a selected group of the homosexual men were required to collect three 24-hour urine specimens for bio-assay. The samples were collected in clean glassware provided for the purpose and were refrigerated after the period of collection until the beginning of analysis. Total neutral 17-ketosteroids were determined by Wooster's (6) modification of the Holtorff and Koch method. Pituitary gonadotrophins were assayed by the bio-assay technique described by Heller, Sevringhaus and Heller (3). Although both methods had long been in use in this laboratory and continued to be used in the hands of the same technical assistants for other normal and patient studies, we provided a series of controls by collecting urine specimens under identical conditions from a series of seven soldier patients in the same psychiatric ward during the same period of time, representing the same age group, using the same diet, but with no reason to suspect homosexual behavior in the group of controls.

The tabulated results show the average age of the controls as 26 compared with an average of 23 years for the homosexual patients. The range of ages is approximately the same. The homosexual subjects would probably be termed overt homosexuals by Myerson and Neustadt. The only cases which have been eliminated from this series were those with psychopathic personality in whom homosexual acts were only one of a variety of paraphiliac sexual activity. Our subjects were all definitely aggressive in their homosexual activities and in fact four of them were known to be members of an organized group. All these men voluntarily brought their homosexuality to the attention of the Chaplain, Unit Commander or Medical Officer. They all expressed difficulty over their sexual excitation because of the stimulation that resulted from their living closely with other soldiers. In none of these cases was there a true neurotic type of conflict over the homosexuality as such. They expressed a realistic anxiety that their homosexuality would lead to court martial. During the psychiatric study they were asked to write their own stories concerning their sexual habits. All these cases were extreme types and had been aggressively homosexual both actively and passively since late childhood and early adolescence. They had participated apparently without conflict in a wide variety of homosexual practices. These homosexual stories were remarkably similar. The cases would be considered extremely questionable from the standpoint of profiting from any therapy; in fact, therapy was not requested or desired by any of them.

LABORATORY STUDIES

One of the striking findings in the gonadotrophic assay is that ten of the subjects had no demonstrable gonadotrophic hormone in the 24-hour urine samples examined. In 7 of these cases 3 samples were examined and such samples were taken on the first, third and fifth days of the period of study. In two other cases, the failure to find the hormone was true of two consecutive 24-hour specimens and in the tenth, only one

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sample of urine was available for examination. This failure to find the pituitary hormone is a distinct contrast with the results in the cases of the control group where in all six men who were studied, there was some gonadotrophic hormone present in at least one of two specimens. This is the uniform finding in adult men in our laboratory. It is to be noted that there were also ten of the homosexual group whose gonadotrophic hormone excretion was comparable to that shown by our control group. In fact the amount of gonadotrophic hormone was higher than we usually find it in young adults in at least four of this latter group of ten men. We have been unable to establish any correlation between the amount of gonadotrophic hormone demonstrated and the physical characteristics of our subjects. Only six of the entire group of homosexuals had any physical suggestion of partial feminine type or of adiposo-genital dystrophy. None of them was truly feminine or infantile.

Turning to the tabulated results on the total neutral 17-ketosteroids the average excretion of the control subjects is seen to be 18.1 mgs. per 24 hours with the range from 11.2 to 30.5. These figures are somewhat higher than reported by Wooster (6) from the same laboratory and with identical technique. His figures ranged from 4 to 24 mgs. with an average of 14, standard deviation being plus or minus 2.4 mgs. In the 21 homosexual men the range was very similar, from 5.1 to 27.8 mgs. with a grand average for the group being 16.6 mgs. The slightly lower average ketosteroid excretion is not a significant difference from that of the controls. However, it will be noted that the first six homosexual subjects had less ketosteroid excretion than any one of the controls. This factor may be of significance in comparison with the work of Myerson and Neustadt and of Wright's group as cited. However, it is also to be noted that the last six men in the table have a higher 17-ketosteroid excretion than any of the control group save the one highest one, whose excretion was beyond that of any other in the group.

The striking variation in the amount of gonadotrophic hormone or of 17-ketosteroids within this group of 21 homosexual men suggests that any statistical treatment of such data is apt to be misleading. We are inclined to suspect that there may be very real endocrine disturbances operative in these subjects but that we do not have available the most direct measure of these disturbances. It would be easy to conceive of the relatively high estrogen-low androgen production in the first 6 men in Table 1 who have low ketosteroid excretion. If this same ratio is the important factor as suggested by Myerson and Neustadt in the others then we should have to expect in the last 6 men in our table an extraordinarily high amount of estrogen. Unfortunately, our facilities did not make it possible to estimate the estrogen excretion in these same specimens, and we have therefore no test of the hypothesis suggested by the previous workers.

It is entirely conceivable that the high 17-ketosteroid excretions observed in at least one-third of our subjects ought to be related to the emotional status of these men in the same sense referred to by Wooster in discussing the increased 17-ketosteroids in the case of those prisoners who were convicted for crimes of violence. The confusion introduced into this subject by using the colorimetric measure for total neutral 17-ketosteroids is regrettable but unavoidable at present. This conclusion applies to the methods used by the other authors referred to above, since determination by the Holtorff-Koch technique, which we have used, and by the method of Callow and Emmens (1) employed by Wright, give esentially similar values. If and when it becomes possible to make colorimetric or bio-assays on urine for androgenic materials which come from testicular source but not from adrenal cortex, this difficulty may be obviated.

DISCUSSION

We are at loss to offer an explanation for the absence of the gonadotrophic hormone from so many of these samples. We cannot detect any systematic errors, any seasonal variations in the sensitivity of the animals used for assay purposes, or any physical characteristics in the subjects which provided clues to this remarkable finding. It is apparent, furthermore, that the lack of gonadotrophic hormone is not to be correlated with either low, normal or high range of 17-ketosteroid excretion. So far as a rather extensive experience goes, this finding of absent gonadotrophic hormone occurs only before puberty or in the case of profound pituitary failure. These men were certainly adult in genital development and had none of the characteristics of pituitary inadequacy so far as clinical examination could detect them.

It is obvious that our data do not lead to any explanation of homosexual behavior but they do add to the conviction that there is an endocrine disturbance accompanying such behavior in many cases. It may be that the difficulty is the amount of hormone produced. On the other hand, it might equally well be that the metabolism of these steroid hormones or of the protein pituitary hormones is in some way different in these individuals. Elusive as the field may be, it seems worthwhile to attempt to devise methods for studying this type of psychosomatic disorder rather than to assume that it is merely a perversion of mental or emotional status which is not amenable to the methods of chemical and physiological investigation.

TABLE I

Subject	Age	Comments	Gonadotrophic hormone excretion in 12-hour fraction			Neutral 17-ketosteroids in 24-hour urine. mg.			
			Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Average
CONTROL CASES									
R. D.	23		+	tr.	tr.	11.2	12.6	.....	11.9
R. C.	27		+	−	.....	14.4	14.6	.....	14.5
J. P.	33		+	tr.	−	15.4	16.8	.....	16.1
C. B.	30		tr.	−	.....	15.2	17.0	.....	16.1
J. F.	23		+	+	−	18.0	20.8	.....	19.4
H. F.	24		lost	.....	.....	20.4	20.8	.....	20.6
L. H.	24		+	−	.....	22	31.6	30.5	28.0
Range	23–33		.....	.....	.....	11.2–30.5		.....	.....
Average	26		.....	.....	.....	19.15		.....	18.1
HOMOSEXUALS									
J. LaB.	21		+	tr.	−	8.4	11.8	.....	10.1
N. B.	24		++	+	++	6.4	14.0	.....	10.2
O. B.	24		lost	.....	.....	10.5	.....	.....	10.5
R. K.	27		−	−	−	9.7	9.9	14.4	11.3
R. Ja.	20		−	−	−	5.1	9.0	20.6	11.6
A. K.	25		+	tr.	−	7.9	12.1	15.0	11.7
R. Ja.	21	Feminine escutcheon	++	+	tr.	12.6	13.2	14.6	13.5
N. J.	22		−	−	−	13.2	13.3	14.6	13.7
R. D.	22		−	−	−	11.0	13.8	18.3	14.3
G. B.	22	Genitals small	−	−	−	13.1	14.4	17.1	14.9
H. H.	21	Gynecomastia	−	−	−	13.8	15.1	16.2	15.0
L. S.	25		−	−	−	13.2	13.5	19.4	15.4
R. S.	22	Feminine escutcheon	+	−	−	12.6	21.0	.....	16.8
R. G.	19		−	.....	.....	19.4	.....	.....	19.4
W. S.	19		++	++	−	20.3	20.7	20.7	20.6
Z. B.	21		++	++	+	17.2	22.8	23.5	21.2
S. F.	26		+	+	.....	20.8	22.8	.....	21.8
P. D.	25	Froehlich ?	+	.....	.....	18.2	23.5	24.0	21.9
C. H.	31	Froehlich ? Married. Became impotent	++	++	.....	19.4	27.0	.....	23.2
R. L.	20		−	−	.....	22.5	25.0	26.0	24.5
A. H.	27		−	−	−	27.4	27.8	27.8	27.7
Range	19–31		.....	.....	.....	5.1–27.8		.....	10.1–27.7
Average	23		.....	.....	.....	16.8		.....	16.6

SUMMARY

Studies on urine of 20 overt homosexual males, aged 19 to 31, showed variable levels of 17-ketosteroid (androgen?) and pituitary gonadotrophin. Half the men had no demonstrable gonadotrophic hormone in a 12-hour urine equivalent, less than any normals studied by the same technique. This was not correlated with any typical physical features or with the level of 17-ketosteroids. These findings suggest that there may be an endocrinological abnormality in some cases of homosexuality.

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TO MEMBERS OF THE AMERICAN SOCIETY FOR RESEARCH IN PSYCHOSOMATIC PROBLEMS

The annual meeting of the Society has been postponed indefinitely. Officers and members of the Council will therefore continue serving until such time as the next annual meeting may be held. In the interim, the Council of the Society will transact whatever business is necessary.

Papers which have been submitted for presentation at the annual meeting will be published in this journal. There is also a possibility that either additional journal supplements or monographs will be issued to insure publication of this material.

While it has been necessary to curtail the more general activities of the Society, the following Research Committees are planning conferences for the fall and winter:

Committee on Psychological Methods and Concepts.
September 18, 1945, in New York.
Presentation of material on *Levels of Regression in Hypnosis,* Captain Herbert Spiegel.

Committee on Infancy and Early Childhood.
November 1945 (tentative) at The Children's Center, Roxbury, Massachusetts.

Committee on Cardiovascular Disease.
December 1945, in New York. *Arterial Hypertension.*

Committee on Physiological Mechanisms and Animal Experimentation.
December 1945, in New York. *Experimental Neuroses.*

Committee on Cutaneous and Allied Diseases.
January 1946, in New York. *Disorders of the Respiratory Tract,* Dr. Harold Wolff and others.

These conferences are limited to Committee members and specially invited guests, but any members of the Society who would like to attend one of the conferences should write to Mrs. Irma Hewlett, Research Secretary, 714 Madison Avenue, New York 21, and every effort will be made to arrange their participation.

In the fall, a Bulletin will be issued to members, reporting in detail the various research and other activities of the Society during the past year.

RUTH POTTER, *Executive Secretary*

THE PURPOSE AND FATE OF A SKIN DISORDER

LESTER W. SONTAG, B.A., B.S., M.D.*

This paper will present the history of a woman whose life has been marred by the appearance of a disfiguring skin disorder, and my knowledge of her emotional processes during the period when this skin condition was recurrently present. My observations and contact with the patient cover a span of seventeen years.

The patient, Elaine, was the older of a family of two children, born in a central Ohio village of about two thousand. She and her sister Margaret lived with their parents in a secure and well-adjusted relationship for the first ten years of her life. At that time their mother died, and her death was followed within two years by that of their father. This early period of Elaine's life was characterized by the following circumstances: (1) The household was highly religious; there was never any confusion permitted between right and wrong. Our patient emerged from her early training with a highly developed conscience and a great sense of responsibility. (2) At the age of seven years, the patient was taught to masturbate by a maid who was sometimes entrusted with her care. This period of masturbation left her with a strong sense of guilt, almost obsessional in character. (3) The loss of her father and mother at a fairly early age tore from her the fine sense of security in which she had always basked.

On the death of her father and mother, the care of the patient and her sister was entrusted to a maiden aunt of rather advanced age. The parents had left little financial provision for the children, so the aunt herself provided the major part of their maintenance from the time Elaine was twelve years old until she had finished high school and secretarial school. This dependence upon an aunt for her livelihood increased Elaine's sense of being a burden which was still further enhanced by the maiden aunt's constant reminder to the children that she was devoting her life and substance to their rearing and maintenance.

When Elaine and Margaret had finished high school, the household was moved to the city, where Elaine might take secretarial training and Margaret attend the state university. During the next two years, during which Elaine alternately worked and attended secretarial school, she had almost no social contact with men. She devoted her time exclusively to her education and to Margaret, seeming almost as preoccupied in Margaret's finding appropriate male companionship as Margaret herself. In many ways she assumed the mother rôle for Margaret, making all Margaret's clothes, cooking meals for her and even preparing dinners for Margaret and her fiancé. In every way she took care of Margaret as a mother might for her daughter. Elaine indicated that she had no interest in marriage, no intention of ever having a mate. She was disdainful of any suggestion that she have dates or let her sister include her in mixed parties. Life during this period was somewhat difficult for both girls because of the aunt's increasingly irritable disposition and her untiring effort to make the girls feel indebted to her and dependent upon her for her care and financial aid in maintaining them.

After two years in the city, Margaret married. Although the man was one of whom Elaine thoroughly approved and while she felt greatly relieved that "Margaret's future was all taken care of" she also felt terribly alone. It was as though her daughter, not her sister, were being married. Elaine then accepted a position as secretary in a business concern in a small town, a hundred miles or so away.

Eighteen months after starting this position, she developed on her face a violent and extensive case of acne rosacea. It was at this time that I first saw Elaine as a patient. The lesion was already extensive, covering the major part of the forehead: an irregular, raised indurated, violently red mass, in which there were several pustules, and in two areas large pus sacs. Other large patches of the lesion appeared on the left cheek and under the chin. In addition to showing this skin manifestation, Elaine was losing weight and complained of fatigue. She was immediately referred to an excellent medical clinic. During her contacts there she was constantly under observation and treatment by a leading dermatologist; two additional dermatologists were consulted frequently on the case. Every sort of therapy known or suspected to be beneficial in acne rosacea was employed. Included in this battery of therapeutic measures were x-ray, ultraviolet light, scarification, typhoid vaccine, various dietary régimes, an iodine-free diet, and rest. In addition to attendance by dermatologists, she had a very careful examination by a competent internist and remained under his supervision for two months. Careful search for a source of infection was made. After two years of care at the

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medical center, there was no appreciable change in the skin condition, although Elaine had regained some weight and energy.

The possible existence of an important psychic factor was revealed in repeated conversations I had with Elaine at this time. Six months before the onset of the acne rosacea, Elaine was becoming increasingly intimate with a sixteen-year-old high school boy, nearly eight years her junior. Both Elaine and the boy believed they were in love and seriously contemplated marriage. Two months before the appearance of the acne, they indulged in their first intercourse, from which Elaine did not experience full gratification. After this experience she was torn by a sense of guilt and the fear that she had become pregnant. She missed the following menstrual period. Despite her desire to possess Joe, she was quite aware of the difficulties that a continued relationship with him would entail. Since Joe was but sixteen and had completed only the first two years of high school, marriage could not be undertaken for at least two or three years. Because of the difference in their interests, the lack of enthusiasm of his parents for the match, and the critical attitude of his schoolmates toward the affair, she realized that the odds were heavily against his maintaining interest in her until marriage was feasible. She was faced then with continuing a sexual relationship which was irreconcilable with her conscience and which filled her with a terrible sense of guilt. In addition, the smallness of the community made her every meeting with Joe a subject for gossip. For two months after she had decided that this relationship must be terminated, she struggled to break it off, and it was toward the end of this period that the acne rosacea appeared.

Discussion of the situation with Elaine a short time after the appearance of the acne rosacea and only a few weeks before she was to give up her job because of it, brought out the following facts: (1) Tremendous conflict existed between her desire for sexual gratification and the remonstrance of her conscience at the means and situation by which she had sought such gratification. This conflict between id and super-ego was resolving itself in favor of super-ego. Her conscience was rigid in its unwillingness to permit a pattern of sexual behavior which conflicted with the sex taboos of the family and culture in which Elaine had grown up; therefore, this sexual expression could not be countenanced. Even in marriage the sexual aspect was of questionable respectability. (2) A strong fear of pregnancy had developed, accentuated by a two-weeks' delay in the menstrual period following intercourse. This fear heightened her anxiety and guilt over the relationship. (3) There was, along with the decision to give up Joe, a certain fear that she might not be able to make the sacrifice. Life became a struggle to sustain her decision not to see him again, and many times decision wavered under her desire. Had Elaine deliberately selected some means to prevent a continuation of her relationship with Joe, she probably could not have found a more effective method than the terrible disfiguration of her face which resulted from the acne. The running pustules, pus-stained gauze, and flame-red surrounding tissue would have effectively repulsed any male. Furthermore, had Elaine elected a punishment for herself for the behavior she viewed as wicked, it would have been difficult to find anything more devastatingly unpleasant to her than the messy and repulsive appearance of her face.

She gave up her job and returned to live with her aunt. Eighteen months later this aunt, who was now quite senile and for whom Elaine was caring, died. Elaine moved into a one-room apartment which she managed to maintain on her small savings and a tiny inheritance from her aunt. Margaret was happily married and lived in another section of the country. It was three years after the onset of the acne before Elaine again held a job; for most of that time she avoided contacts with people and stayed as closely as possible within the four walls of her apartment. During the last three months of that three years the acne gradually disappeared. It was as if the super-ego had exacted sufficient penance. True, Elaine had tried various measures—diets, x-ray, etc.—during the three years, but there was no evidence that any of these had any important effect on the course of the acne. It seems probable that its disappearance was not associated with the effectiveness of any therapeutic measure.

Elaine immediately sought and obtained a job as secretary. Her general health improved, she gained some small amount of weight, and her face continued clear. There was no recurrence of the acne during the next four years. Then she had a moderately severe outbreak of the condition again. A discussion of the situation with her at that time brought out the following facts: She had had little contact with men during the entire period following the affair with Joe until about six months prior to the date on which I talked with her. During the months previous to our conversation and previous to the recurrence of the acne, a bond had been growing between her and her employer, a man somewhat older than she, with a wife and two children. This man, Bill, and Elaine had much in common; they often worked together evenings and increasingly they liked and confided in each other. Bill's home adjustment was far from ideal. His present station in life was far below that to which he had aspired and to which his ability and initiative would seem to entitle him. He had failed always in realizing his full potentialities because of a violent temper and an inability to work well with other people. Elaine found that Bill was

becoming the subject of sexual fantasies and that she was becoming very fond of him. Upon two or three occasions the affection was expressed physically, although in each instance it stopped short of intercourse. Again Elaine's super-ego exerted itself. Bill's wife and children were dear friends of hers; she was to all intents and purposes a member of his family; she could not let this affair with him grow to the point of betrayal of his wife and children. Again she had need to protect herself against her "weakness." It was during this period of conflict and anxiety, as well as heightened but ungratified sexual desire, that the acne rosacea reoccurred. The acne was present this time for about eighteen months but in a slightly less severe state than had originally been the case. Therapy again was of no avail. Elaine continued her work, and six months after the onset of this condition, Bill resigned his job in the company and sought employment elsewhere. Shortly afterward he became ill and spent a number of months in a hospital. These changes effectively terminated the growing relationship between Elaine and Bill, and disappearance of the acne followed within six weeks. Again, if Elaine had attempted to erect some barrier between herself and Bill, it would have been difficult to find one more effective than the acne. And had she wished to punish herself for desiring Bill, again the acne would have been a most effective measure. Because of her sensitivity about her appearance, it did have a major part, along with Bill's change of business and his illness, in separating the two.

Elaine's face remained entirely clear for five years. Again the acne appeared, in less severe form than the initial lesions but to a degree which, nevertheless, was markedly disfiguring. When Elaine sought help on the matter she readily admitted that for four months she had been having sexual relations with a man who was married and had three children, and that her life was again in a turmoil. Her maturity had brought about a growing rebellion against the early sex taboos. There was an increasing conviction that she had a right to some sexual life, regardless of the conditions under which it was pursued. This time she was definitely unwilling to give up the sexual expression she was enjoying, yet she was flagellating herself with the thought that she was destroying the home of another woman—although in this situation one she did not know. A conflict still raged between desire, and conscience and taboo. She had reached largely of her own accord the conclusion that there was a direct relationship between her conflicts and the appearance of the acne.

During the few hours which were available for therapy, Elaine showed some evidence of being willing to accept certain tenets. The first of these developed from her being asked to examine critically the damage she had done to the home of the wife of her sexual partner. During the course of this appraisal, she volunteered the following facts: that Fred and his wife had had little in common for at least three or four years before she had known him; that no sexual relations had existed between Fred and his wife for at least many months before Elaine's meeting him; and that Fred had already been contemplating a divorce. Concern for the welfare of the children, plus the fact that a divorce in that tiny and highly religious community would have cost him his teaching job, were all that had prevented his starting suit. Elaine suddenly saw herself, then, not as one who was breaking up a home, but rather as one who, while acquiring something vital to her own life, was actually insuring that home's continued existence. She recognized that under these circumstances the only harm her relationship to Fred could do him or his family would be the shame and community condemnation caused in the event it was discovered. But since she and Fred lived in different communities and did have legitimate occasion to see each other on business, they could, by being discreet, almost certainly avoid the discovery of their meetings and their real relationship. If Elaine could completely accept this analysis of the relationship, there remained only the fear of pregnancy. Effective means of contraception could eliminate that source of anxiety.

During the three months following our brief sessions, Elaine proceeded to elaborate on the subjects we had discussed, to talk them over with Fred, and to digest them thoroughly. She emerged from this period of self-therapy having accepted fully the fact that no basis existed for any suffering she had endured from her super-ego. Her ego was now strong enough so that she could discard the taboos of her early childhood and her parents' world and fulfill her libidinal drives in a way appropriate to the reality situation. She was intellectually convinced that the continuation of her relationship with Fred was entirely justified and emotionally she accepted this solution. The last vestiges of the acne were fading from her face when she came to me to explain the conclusions she had reached. Since then four years have elapsed, during which she has maintained the relationship without interruption and without recurrence of the acne.

In any attempt to interpret the possible relationship of this girl's acne rosacea to her emotional status, there must remain a great deal of speculation. Acne rosacea appears to start as flushing of certain portions of the face. Tobias says "acne rosacea is due to a reflex circulatory disturbance involving the forehead, cheeks, and V of the neck. These are known as 'flush areas.' . . . . Predisposing factors include . . . . colitis, high blood pressure, emotional neuroses" (3). It is interesting to note that in Tobias' discussion of etiology, he not only

mentions "emotional neuroses" but also high blood pressure and colitis, two conditions themselves considered psychosomatic diseases, and perhaps other manifestations of the neurosis expressed as acne rosacea. Rothman in his excellent discussion of the rôle of the autonomic nervous system in cutaneous disorders has emphasized the mechanisms through which a dilatation of the cutaneous arterioles may be accomplished either as an adrenergic or cholinergic process. Emotions may then effect such vasodilation either as an adrenergic or cholinergic response. The fact that both types of responses may produce cutaneous vasodilation is not helpful to us, however, in attempting to assess the nature of an emotional state which, in the case described here, seemed to be associated with if not the cause of the skin pathology. Anxiety resulting from pressure of conscience could produce an adrenergic vasodilation. So could fear of pregnancy. Sexual excitement might perhaps produce either. The nature of the lesion does not, then, offer a physiological basis for discriminating between possible emotional sources of the basic cutaneous vasodilation.

Rothman suggests that responses of cutaneous strictures to autonomic nervous stimulation from emotional sources is of short duration. Pilomotor vasodilation, vasoconstriction, and increased sweat and subcutaneous secretion resulting from emotional changes are very temporary. Blushing, while severe and recurrent, never lasts for any great period of time, and the same thing applies to emotional sweating. He feels, therefore, that while emotional states are often very important in influencing the course of a skin disease, they probably are not the basic cause of the disease. It may be well to question that thesis. Are the skin manifestations of emotional processes necessarily short-lived or have we not learned to recognize the chronic ones? Emotional stress may cause violent stimulation of the gastro-intestinal tract with diarrhea or vomiting of a few hours' duration. It may also when present as a chronic anxiety state express itself in chronic mucous colitis or chronic spastic constipation. The immediate vascular response to fear is an increased tension and a very temporary but marked increase in blood pressure. Chronic anxiety, however, when present in individuals of the proper constitutional type may express itself as a chronic benign hypertension. There are many other examples of immediate and prolonged responses to emotional states. Would it not be rational to suppose that emotional stresses expressed through the autonomic system to cutaneous structure might be either chronic or temporary, just as they are in other parts of the body? If such is the case, are we failing to recognize these more prolonged or chronic responses? Perhaps acne rosacea, for example, could be a chronic and localized vascular disturbance of emotional origin. Secondary infection, of course, tends to occur anywhere when vascular disturbance interferes with normal circulation. Pustules and indurated areas therefore are not difficult to explain. They may be no different from the inflamatory changes of a peptic ulcer or ulcerative colitis. Again one may presume a constitutional factor. Rothman says "The individual difference in quality and intensity of the autonomic responses to emotions have their seat more often in the peripheral neuron and in the effector organs rather than in the center. A person who blushes easily responds also with increased local dilation to heat stimuli, and bashfulness is not necessarily the main feature of his personality. A person who experiences goose flesh when listening to a gruesome story responds more readily with pilomotion to cold than others do" (1). This concept implies again the constitutional factor in the choice of somatic expression of a neurosis.

That the skin condition described in this paper is influenced if not caused by certain aspects of the patient's emotional state is strongly suggested by the temporal correlation of the two. If the rôle of emotions in the etiology of acne is accepted, it may be assumed that the pathology is a vascular response to an anxiety state. The possibility of the emotions expressing themselves in a more meaningful or purposeful manner might even be considered. Sulzberger, in his discussion of Rothman's paper, describes the rather remarkable abilities of a patient seen by him and by Rothman during their studies with Lesser. This patient made his living by going from one medical school to another demonstrating his voluntary control of his autonomic nervous system. Sulzberger says, "He could produce goose pimples almost anywhere at will. He could accelerate or depress his heart rate at will. . . . . He could dilate and contract his pupils. He could simultaneously cry on one side of his face and laugh on the other . . . . I . . . . asked him how he brought about these things. He said he had to visualize for instance plunging a part into cold water in order to create the pilomotor response to that part. And that he had to think of heat being applied to a certain part of the body in order to produce sweating of that part" (2).

Such voluntary control of autonomic action by area in certain unusual patients suggests, of course, the possibility of the unconscious mind expressing itself selectively through autonomic controls to the skin of any section of the body. Is it possible that Elaine's emotional responses of guilt and shame were expressed in the skin of her face because there they exacted the atonement necessary for her "sin," and might have strengthened her will to forego behavior which her conscience could not tolerate?

SUMMARY

This is a case report of a woman whose life was marred by a severe and disfiguring skin disease, one considered by leading dermatologists to be due to a cutaneous circulatory disturbance. The original appearance of the condition and its recurrence coincided with periods of severe emotional stress associated with sexual problems. Any one of the following interpretations of the significance of this relationship might be made.

1. That the relationship was a coincidence.
2. That the emotional distress was disturbing to all metabolic processes and nutrition, and that the acne rosacea was only one aspect of such a generalized disturbance.
3. That the acne resulted from autonomic-induced cutaneous vasodilation, incident to periods of disturbed emotional state.
4. That the acne was a purposeful action of the unconscious, a punishment and a safeguard, accomplished through autonomic control of the cutaneous vascular bed.

The title of this paper suggests that Elaine's acne rosacea may have been a purposeful process. However, while it *is* my intention to suggest and discuss this possibility, I do not wish to imply that it is necessarily the correct one.

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EIGHTH SERVICE COMMAND POSTGRADUATE MEDICAL EDUCATION

Neuropsychiatric Case Report

case no. 12—july 1944

PRESENT ILLNESS

The patient, a 26-year-old soldier, was referred to the Consultation Service of a replacement training center on January 18, 1944 by his dispensary surgeon because of "nervousness, blurring of vision, and weakness of thighs." Comment from the surgeon was that the soldier had appeared on sick call three consecutive days with the same complaints; that the "nervousness was not on the outside but on the inside, such as possibly a neuro-circulatory asthenia syndrome." At the time of referral the soldier was in his ninth day of training, having arrived at the training center on January 9, 1944.

PERSONAL HISTORY

The patient was born August 7, 1917.

Education: Completed the eighth grade at 14 years and got along well.

Employment: Worked on a farm until two years before, and after that was employed in a packing company in Montana as a butcher at a salary of 90 cents per hour. He said he quit two months before induction, on account of his nerves.

Habits: No drinking, smoked moderately. No arrests.

Interests: Liked swimming, hunting, fishing, and dancing. Never cared for any kind of ball games. Said he had always been sociable, had many friends, and liked to be with people.

Marital History: Married on July 1, 1939 in Montana. Wife, 28 years old, had had an ectopic pregnancy two years before. Couple lived alone until the patient's induction, and since then the wife had been living with her parents in Montana.

Illnesses: At the age of 12 years the patient was kicked in the right ankle by a horse, suffering a sprain; but he had had no trouble with the foot since. At the age of 13 years he was cut by a wire on the inside of his left hand and stitches were necessary; no difficulty with the hand since. He had gonorrhea in 1938, for which he received medical treatment. The patient claimed he had had a goitre since the age of 14 years.

He felt that he had been in the present nervous condition since the age of 15 years and said, "I get excited and get in a cold sweat. I never could go to a spooky movie. If anyone hollered at me and bawled me out I would be set off." However, he said he got along fairly well until about two years before when he began having "spells," which came on at varying intervals of from one every six weeks to several times a day. He described the attacks as follows: He had a dizzy and weak feeling, a blurring of eyesight, and then a feeling of numbness went up his legs and he felt that his legs were being drawn upward. There was no lapse of consciousness and no feeling of mental confusion. The duration of an attack was about a minute, and the attack was followed by a feeling of weakness which lasted a few minutes. He had never fallen down and had had no sensation of falling. The attacks were brought on by excitement or any emotional strain. They were apt to occur during an exciting movie, after a funeral, or after he had worked too hard. The patient said they were frightening to him and he dreaded their occurrence. Since they began, two years before,

the longest period without an attack had been about six weeks. They were more apt to occur in the late evening up until bedtime. They occurred at work, on the street, at home, or at any place he happened to be.

In February, 1943, the patient consulted a local doctor because of these attacks but said the doctor could not diagnose his case. He gave the patient some "nerve pills," and the patient never returned to him. In October, 1943, he consulted a second doctor, who told the patient his difficulty might be chorea. He also gave him some pills, and the patient did not return. About that same time he went to a third doctor, who recommended that he quit his job. The patient was also having some gastric trouble at this time, suffering from nausea and bloating. He stated that one doctor told him he had a goitre which might be causing the attacks. At this time the patient gave up his work, as he said he was so shaky that it did not seem safe for him to be handling the knives in his butchering work. He stated, "at that time I could not sleep and was completely worn out."

Military History: The patient had been at this station since January, 1944. He stated that he wanted to come into the Army, as he felt his condition might be helped by a change of surroundings. He did not mention these attacks to the doctor at the Induction Station. He had several of the attacks while in the Reception Center but did not report them. Since he had been at this station, the attacks had been very frequent. He could not tell what precipitated them except "the guns and stuff." The soldier didn't feel he would ever be able to get along because of his condition. He claimed that he had no worries at home and that he had tried to adjust while at this station and keep his mind off his condition. The patient was very restless during the interview, constantly handling the pencils on the desk and shifting in his chair. He repeated that he was anxious for some medical care and said, "I am as normal as anyone between spells."

FAMILY HISTORY

Father: Born in Nebraska, 54 years before; was in good health and was employed by a cement contractor.

Mother: Born in Russia 49 years before; came to the United States 25 years before and was now a citizen. She suffered with high blood pressure and was "nervous, gets shaky, can't sleep, worries, and is easily upset"; was periodically under medical care.

Patient was the second of 12 living children:

Sister: Age 28, well, married, and had two children.

Patient.

Sister: Age 25, well, married, and had one child.

Brother: Age 23, well, in the Army in Africa.

Sister: Age 22, well, married.

Sister: Age 18, well; employed in a packing house.

Brother: Age 17, well; employed in a hatchery.

Sister: Age 14, well.

Brother: Age 12. Patient says he had had St. Vitus dance and had missed three years of school. He was now partially recovered.

Sister: Age 8, well.

Sister: Age 6, well.

One brother died at two years of pneumonia and another brother died at nine years of pneumonia.

EXAMINATION DATA AND PROGRESS

On arrival at the replacement training center and during the classification and assignment process the soldier filled out the Consultation Service Questionnaire to indicate that there was a history of nervous disorders in his family, that he felt his induction into the Army a mistake, that he was "nervous" much of the time, that he could not work well when watched, that he had never been active in sports, and that there were worrisome problems at home.

Physical examination, neurological examination, and review of the history of the present illness revealed nothing suggestive of convulsive syndrome or other organic physiological disorder.

Search of the psychogenic field brought out the following: At the age of eight he developed an acute tonsillitis which he recalled was accompanied by a strong fear of death (the first such fear he could remember). During this episode his mother was his main and almost only security. He recalled that at the age of nine or ten sexual interests drove him to some peeping, accompanied by feelings of guilt. On questioning it came out that at age of twelve he was so closely attached to his mother and so generally resentful of his father that he was frequently miserable, and that these feelings remained with him more or less constantly up to the age of 16 or 17. At age 15, while helping his father kill a pig by bleeding, he suddenly developed feelings of faintness, weakness, dizziness, and generalized shaking of such severity that he had to be carried into the house. The remarkable thing to him was that he has continued to have "spells" of these same feelings ever since and that they constituted his present difficulty. At this point he admitted that, since the pig episode, "death" had had a peculiar and terrifying fascination for him, and he recalled at length the many occasions in his life when he had been upset essentially by a reference to death. The patient "settled down" and followed this line of investigation, so the examiner felt that herein was his basic problem.

After a very simple and, on a time basis, a very superficial explanation of these reactions to the patient, he said, "There is my trouble—for the first time I think I understand it."

As a result of this first interview a note was forwarded to the battery commander, as follows:

> "This soldier has had a nervous disorder since the age of 14 or 15. It is not now severe and I have hopes that it is correctible. Suggest that he return to Consultation Service on January 28, 1944. Meanwhile, he is capable of performing full training activities."

On January 28, 1944, the soldier returned, stating that he was rapidly getting better. He appeared much more at ease, was cheerful, and said that his training was going fine. The explanation regarding his past trouble was repeated with the main emphasis to the effect that the troublesome emotional reactions were boyhood reactions and that there was no more reason to be bothered now by these boyhood emotional mistakes than there was to be bothered by other mistakes and errors in judgment such as lying and the like. As a result of this second visit the following note was sent to the battery:

"Pvt. — has had a nervous disorder since the age of 14 or 15, characterized by over-attachment to mother, resentment of father, and the guilt reactions that accompany such situations. This has all led to preoccupation regarding death and general frustration. I have attempted to develop his insight regarding all this, I believe with some success.

"He is today more at ease; says his training is going better, etc., indicating that there is good outlook for clearing the neurosis. His only complaint today is mild headache and 'cracking' of his ears, which would seem to come from a persistent Oklahoma cold.

"I will see him again and follow the progress. Meanwhile suggest nose drops, etc., for the nose-ear condition, if any. I have referred him to the dispensary regarding the latter."

The soldier was not seen again until he was in his 12th week of training. He reported as follows:

"After the last visit I felt good; as though a load was off my mind, relieved. I could see that for 15 years I had been upsetting myself with a lot of unnecessary worry. For the first time in 15 years I was able to sleep good. I felt altogether different and better—just good. I did everything a lot easier. I could enjoy working and keep my mind on my work. I got on fine until about three days ago—then it seemed to come back again. I couldn't sleep, couldn't rest or concentrate, and I made mistakes in drilling. I went back to worrying about dying, about death, etc., just as before."

He felt that he was getting over this spell, but his sense of security and confidence was obviously shaken. Search for the cause brought out an obvious relationship between this three-day upset and his reading about a series of truck murders that had received daily news spreads for three or four days. The same explanations and reasonings regarding the nature of his reactions were given as on the two previous occasions and he returned to duty.

Checking with the battery officers recently brought these following comments:

The platoon commander stated:

"Pvt. — has shown a definite improvement in his training. He is enthusiastic and is considered well-versed in his military specialty."

The sergeant, his technical instructor, stated:

"Pvt. — has done very well in his training and marked improvement has been noted."

The sergeant further stated that Private — had apparently ironed out most of his difficulties and, although he was somewhat handicapped in physical training by his small size, the battery would like to retain him as a cadreman.

DISCUSSION

This case represents a type that has been seen often in this Consultation Service. Psychotherapy on the superficial basis that Army routine will permit has been successful, it seems, to a worthwhile degree. Such success is not always the case with such problems; but it seems a fair conclusion that, since Army psychiatry has not the time for prolonged searching and evaluation of the recoverability of particular neuroses, all of them should be given at least a trial of superficial therapy while the soldier is in the Army training situation.

REVIEWS OF PERIODICAL LITERATURE

BRILL, NORMAN Q., TATE, MILDRED C., AND MENNINGER, WILLIAM C.: *Enlisted Men Discharged from the Army Because of Psychoneuroses, Follow-Up Study.* J. A. M. A., **128**:633, 1945.

This paper is based upon a random selection of men discharged from the Army during the eight month period between May 1, 1943 and Jan. 1, 1944 and was made on the basis of serial numbers. All of the men had been out of the service at least six months. Approximately 7,000 names were selected. Basic data used were obtained from the Medical Statistics Division of the Surgeon General's office and from the Demobilized Records Branch of the Adjutant General's Office. In only 5,937 cases was sufficient information available to warrant inclusion in the study.

A questionnaire to be mailed was drawn up with the assistance of the Morale Service Division. In order to determine whether or not the presence of an individual's name on the questionnaire would in any way influence the validity of his replies, a preliminary sampling of 500 was undertaken. In half of these the individual's name appeared on the questionnaire and in the other half no identification was included. In the latter group, in order to determine whether anonymity was preferred, a note was added stating that it was not necessary to sign one's name.

Assurance was given that replies would remain confidential and that no information would be transmitted to any other government agency or be used in the veteran's further relations with the Army. It was realized that the replies would represent subjective impressions, perhaps colored by many motives, and that they would not be completely objective. However, it was believed to be important to determine at least what the veterans would say about themselves, recognizing limitations in the reliability of responses obtained in this manner.

Replies to this pretesting showed that approximately one half of those who were given the opportunity to remain anonymous chose to identify themselves and that there was no qualitative or quantitative difference in the replies from the main group as compared with the anonymous group.

In all, 5,937 questionnaires with the individual's name on them were mailed to enlisted men discharged from the Army on certificates of disability with the diagnosis of psychoneurosis, and 4,178 (over 70%) replies were received.

Since it was possible that the 30% who did not reply might differ from the others with respect to their health and employment and therefore affect the reliability of the findings, a personal follow-up on a sampling of 200 of this group was undertaken with the assistance of the Home Service of the American Red Cross. Replies obtained in this fashion were essentially the same as those in the large group.

The results of the study indicate that men discharged from the Army because of psychoneurosis differ significantly from the Army average with regard to age, education and Army grade.

In general, those discharged from the Army with a diagnosis of psychoneurosis consider their health to have been adversely affected by their Army service. They believe themselves to be in poorer health that at induction. They consider their health impairment chiefly in terms of physical disease and in general do not recognize the psychologic aspects.

The longer a man in this group served in the Army, the more likely he is to consider his health to be affected. Similarly, the men who served overseas consider themselves to be sicker than do those who did not see any overseas service. In addition to their reporting poor health, a need was expressed for medical and hospital care which is far beyond their prearmy requirements.

The vast majority of those studied are working but definite changes in their employability are apparent. More men are unemployed now than at the time of induction. The unemployed group is for the most part composed of those who were working before induction. In their subjective estimate of their reasons for not working now, the unemployed, to a great extent, attribute their failure to work to poor health. There was little indication that they were discriminated against by prospective employers because they received a medical discharge.

Overseas service was reported by 13.7% of the group. This percentage may increase as time goes on. It is not possible, however, to predict at this time the effect such an increase would have on the findings of future similar studies. A special investigation of the overseas group will be undertaken in an attempt to determine whether or not they comprise a special group in terms of adjustment.

The authors recognize the limitations of the method used in obtaining data. The replies received by mail from the men are purely suggestive. The results may not be a reflection of their true state of health. Exaggerations may have been made consciously or unconsciously for a variety of reasons. However, the veterans' own evaluation of their conditions is important and cannot be ignored. The findings indicate

that there was very little tendency for them to report change in their conditions between discharge and the follow-up study. There is a distinct suggestion of permanence of their disorders in their own minds. Active measures will have to be taken if this attitude or state of affairs is to be influenced.

It is recognized that employment is easy to secure at this time and that adjustment in terms of employment is relatively simple now. It is not possible to predict what will happen in the future. Factors will be present which may influence adjustment in opposite directions. The end of the war may produce in some a change in intrapsychic tension and need for illness. Time alone may bring with it improvement. Increased competition for fewer jobs will exert its influence, and the socio-economic condition of the postwar world will be an important factor affecting the adjustment of these men. (F. V. L.)

LERNER, EUGENE: *Preface to the Psychology of Peace and Reconstruction.* J. Psychol., **15**:3, 1943.

From various discussions of peace problems, ranging in point of view from Herbert Hoover to George Soule, the author has culled a number of "peace planning assumptions." These include representative government, resettlement, general education and the like. The author then attempts to link up these categories with current clinical observations. Thus, he says, the principle of representative government, for example, dealing with the limitations of governmental authority and the degree of personal liberty, corresponds to the functional ratio of psychological dependence and independence. Again, nationalism ties up with the problem of egocentricity and the socialization or domestication of individuals.

The author concludes that the planning assumptions selected for examination are in accord with relevant clinical and research findings regarding individual and public mental health. In working toward such feasible goals of reconstruction and lasting peace, a considerable number of clinical and research methods of procedure seem indicated from the various fields of psychology. Adapting such techniques and training personnel in their application under likely field conditions seems urgently desirable.

The planning assumptions and related programs ought to be scrutinized by other psychologists, psychiatrists, social scientists, educators and social workers. Clinical and research techniques most likely to be useful in reconstruction work ought to be studied, adapted, pretested through collaborations by the greatest possible number of specialists, planning agencies and students. Because of the present shortage of men, a great number of college-trained and professional women will probably be needed and ought to be mobilized in this connection.

Since the Nazis went at their task of "education for death" with such terrible thoroughness, there can be little doubt about the need for preparing and then using a whole battery of psychological and related techniques, including personnel especially trained for such work.

Psychological reconstruction after the war will probably have to extend over a period of several decades. Creative inventiveness in preparing the tools for such work is no less urgent than that demanded and supported by government and industry in the field of military and war production. Proper psychological methods of approach have never had a real chance before in reconstruction and war prevention work, partly because they were not quite available. They are available now and must be given a chance, along with military and economic measures. (F. V. L.)

GANADO, WALTER: *The Clinical Characters of Pain.* Br. Med. J., p. 142, Feb. 3, 1945.

This paper discusses pain from a physiological standpoint. From their physiological characters, the author concludes, we can distinguish types of pain each of which is related to a definite group of tissues. These tissues have in common their relation to the body surface.

There must be in each segment, the author believes, a complex mechanism which presides over the manifestation of deep pain in that segment. This mechanism can be set in motion by certain visceral as well as somatic afferents. Their connections must be such that the whole or the greater part of the mechanism can be set in motion by even limited injury; hence the pain is distributed widely and lacks discrimination. More superficial tissues have connections which are more limited, while the connections of the hollow abdominal viscera which have a mesial attachment in their embryonic life are distinct.

The connections from the skin must be entirely different, as the pain differs not only in the discrimination, power of location, and type of reflexes provoked, but also in quality. (F. V. L.)

DOW, ROBERT S., ULETT, GEORGE, AND RAAF, JOHN: *Electroencephalographic Studies Immediately Following Head Injury.* Am. J. Psychiat., **101**:174, 1944.

By making EEGs upon a large number of patients with mild head trauma as soon as possible after injury, it was thought that some light might be thrown on the mechanism of the production of the concussion, and the onset and duration of abnormal electroen-

cephalographic activity where concussion was presumably uncomplicated by contusion and laceration of the brain.

The authors concluded:

If mild cerebral trauma produced changes in the EEG tracing the abnormality disappeared within a period of a few minutes in the vast majority of cases.

Patients who gave a history of amnesia following cerebral trauma, but were clear mentally at the time the EEG was taken, showed only a slight increase in the percentage of abnormal records as compared to the control series. This was true even where the records were taken within a few hours of the accident.

If there was any impairment of consciousness of any degree at the time the EEG was taken, abnormality of the EEG was the rule.

EEG records taken within 30 minutes after patients sustained head injury showed a greater percentage of abnormality that those taken after 30 minutes had elapsed. The rapid disappearance of abnormal EEG findings points to some mechanism in concussion other than petechial hemorrhage, cerebral contusion, embolic phenomenon, or any other histopathological change which must of necessity require several days to disappear.

In the patients with abnormal EEG records the average velocity of the striking object or of the falling head at the time of impact was greater than the velocity necessary to produce concussion in experimental animals as determined by others. The average velocity of the striking object or falling head in patients who showed normal or borderline EEG records was less than the velocity necessary to produce concussion in experimental animals.

The study of the EEG records taken immediately following mild head injury was less reliable than clinical judgment in predicting time loss from work. (F. V. L.)

PINNER, MAX. *Beeinflussung des Komplements durch Gifte.* Beiträge zur Klinik der Tuberkulose. Berlin, Julius Springer, 1921.

Because of the prevalent feeling today that there is no concrete experimental evidence of a psychogenic influence on resistance to infection, it is felt that readers might be interested in a review of this article, published over 20 years ago.

Dr. Pinner discusses the widely accepted clinical theory that immune forces are influenced by the nervous system and refers to experimental work on the influence of nervous toxins upon resistance by Trommsdorf, Salomsen and Madsen, Leva, and Friedberger.

He injected highly toxic doses of atropine, adrenalin, pilocarpine and physostigmine into guinea pigs and then measured the complement content of their blood. When so used, atropine and adrenalin reduced the complement content of the serum, and pilocarpine and physistigmine increased it. These effects could not be obtained by administering the drug to the serum in vitro. He felt that the increase in complement in the case of the para-sympathomimetic drugs could not be accounted for on the basis of changes in blood volume.

B. R. M.

BOOK REVIEWS

GANTT, W. HORSLEY: *Experimental Basis for Neurotic Behavior. Origin and Development of Artificially Produced Disturbances of Behavior in Dogs.* New York, Paul B. Hoeber, Inc., 1944, 211 pp. $4.50.

"In the laboratory animal, in contrast to present knowledge concerning the human subject, the spread of the nervous imbalance can be detected before it is overtly expressed, traced from its origin step by step, and followed during its extension to the various physiological systems." Thus, in the author's words, may be summarized the lesson learned from twelve years of painstaking recording of the intensive, prolonged and comparative studies of the "behavior disorders" produced in three dogs by the conditioned reflex method.

In a brief historical survey of evidence for "objective psychopathology" the author points "with exaltation" to such quantitative developments as a mathematical description of the conditioned reflex. However, he cautions that "even the use of a formula derived under the strict conditions of the laboratory is generally not applicable to psychobiological phenomena in daily life." Likewise, he emphasizes that irrespective of quantitative data, in the final analysis "behavior is important as it alone is ultimately the criterion of the disturbance."

Striking demonstrations are presented of the practicability and value of quantitative measurements of heart rate, respiration, motor activity, the rate of conditioned reflex formation and other phenomena in the detection of psychologic disturbances long before there is any overt disorder of behavior. The abnormalities consisted of "either too much or too little response" in a given situation, or in the appearance of entirely new reactions. It is of some interest to note

that "the marked character, regular manifestation and stereotypy of pattern of many of the symptom-complexes if they had occurred in the human patient would probably have led to the diagnosis of cardiac, respiratory, urinary, sexual, etc., neurosis."

One of the most impressive facts developed in this monograph is the rôle of the individual personality in the development of behavior disorders. As the author states "the result depends even more upon the individual than upon the environment, ... the stable showed only a slight or temporary disturbance, the susceptible, a pronounced and even chronic neurosis." Further "the stable animal remains stable and the labile animal who cracks under one kind of stress shows the same pattern of abnormality under other stresses." That this principle applies to man can be inferred from the information that is being collected concerning the behavior of men exposed to the stresses of the battlefield as compared to their behavior in civilian situations with relatively smaller degrees of stress.

The author emphasizes that, of all the therapeutic measures employed, the prolonged rest in another environment plus certain social factors were almost the only ones effective. This can be endorsed by many clinicians who have found similar therapy effective in man.

Of great interest are the interpretations presented by proponents of different schools of thought to whom the author presented his material. Whereas the psychoanalytic evaluation indicated a particular behavior disorder to be indicative of aggressive reactions, the neurophysiologist interpreted the same behavior on the principle of physiological proximity. It is obvious from the divergent interpretations presented that although definite behavior disorders can be produced in animals, as yet an adequate interpretation of why they occur or of the precise mechanisms must await further study.

I. Arthur A. Mirsky

Linton, Ralph: *The Cultural Background of Personality*. New York, D. Appleton-Century Co., 1945, 157 pp. $1.50.

Dr. Linton, successor to the late Franz Boas, believes that "the most fundamental problem which confronts students of personality today is that of the degree to which the deeper levels of personality are conditioned by environmental factors."

We are too close to these factors to see them in our own culture and must learn about them by comparing different cultures. Dr. Linton does not make the comparisons in this little book but rather devotes himself to defining, discussing and clarifying the chief terms used in cultural anthropology, in an endeavor to facilitate collaboration between students of culture and of personality.

What can result from such collaborations is seen, for example, in the statement that "even such a master as Freud frequently posited instincts to account for reactions which we now see as directly referable to cultural conditioning . . . . results of our own particular patterns of child care."

Workers in psychosomatic medicine who have taken an interest in the behavior and attitudes of members of non-European societies will find Dr. Linton's short, clear exposition of the main formulations of cultural anthropology useful, even if they are not exactly new.

Dr. Linton concludes that "culture must be considered the dominant factor in establishing the basic personality types for various societies. . . . . With respect to the formation of individual personalities, culture operates as one of a series of factors which also includes the physiologically determined potentialities of the individual and his relations with other individuals."

Louis Paul

Stern, Bernhard J.: *American Medical Practice in the Perspectives of a Century*. New York, The Commonwealth Fund, 1945, 156 pp. $1.50.

No science, and perhaps least of all medicine, exists in a social vacuum: the patient is at the same time a unit in a complex cultural structure. This impinges on him so often and in so many ways that it is no longer possible to treat him satisfactorily without adequately understanding the environment in which he lives. This formulation, expressed in one fashion or another, has become a medical platitude without benefit of actual assimilation into the everyday practice of medicine. Repeatedly one hears lip service being paid to the concept of "the total personality," "man as a whole," etc.

Stern provides the opportunity, in one easy lesson, to acquire an astonishing amount of information about both patient and doctor in relation to the world in which they live. The wealth of statistical information is very much alive, covering many different aspects of the doctor's practice and the patient's problems. That the practice of medicine is undergoing revolutionary changes whose ultimate results we cannot see is clear even to the tired and socially myopic practitioner. This book traces the background for the present structure of medical practice, and affords a wealth of data from which the reader can at least catch a glimpse of what the future may hold. A very proper concern for the welfare of the patient, as well as the doctor, permeates the text.

One might have anticipated that the significance of psychiatry in this picture would warrant giving that subject at least as much space as is given to a discussion of the rôle of the clinical thermometer in medical history. This, however, is a very minor flaw.

JOSEPH LANDER

ELMER, M. C.: *The Sociology of the Family.* Boston, Ginn & Co., 1945, 520 pp. $3.75.

Professor Elmer of the University of Pittsburgh, author of *Family Adjustment and Social Change* (1932), holds that "the family has changed, in emphasis if not in entirety, from an institution with a wide variety of functions, several of a purely material or occupational nature, to an institution of emotional control, a storehouse of social philosophy, and a medium of psychic understanding. Its importance has become psychic even more than material."

In line with this emphasis on the psychosocial aspects of the family which pervades the volume, Professor Elmer allots several chapters in this college textbook to the family as a psychic fact, development of personality, and socialization of the child. Here the discussion is on what might be called the "mental hygiene" level, with but cursory acknowledgment of underlying psychodynamic factors. It should be supplemented with Flugel's *Psycho-Analytic Study of the Family* and Kardiner's *Psychological Frontiers of Society.*

The book is in six parts, dealing with the family in reference to its sociological setting, social control, population, social change and adjustment, and the socializing process. There are suggestions for further study and a bibliography of recent books and articles at the end of each chapter. It reads easily, with a welcome absence of professional jargon, and displays the common sense approach of an author who has no theory to push or school to defend.

LOUIS PAUL

Convalescence and Rehabilitation. New York Committee on Public Health Relations. The New York Academy of Medicine, 1944.

This book is a transcript of the proceedings of a Conference held as a sequel to two previous ones, in 1925 and 1939, and contains discussions of the problems of rehabilitation by the Army, the Navy, the Army Air Forces, the Public Health Service, and the Office of Vocational Rehabilitation, the Veterans Administration and various civilians who have done outstanding work in the field. This broad and increasingly important aspect of medical care is covered comprehensively and the volume will serve as a valuable source book for rehabilitation workers.

Dr. William S. Tillett presented an arresting theory of the relation of protein balance in convalescence to the androgenic and adrenal-cortical hormones—a possible link between the psychiatric and physiological aspects of rehabilitation.

There seemed to be general agreement that planned programs result in fewer convalescent days and a greater degree of recovery than do haphazard prescriptions of "Tincture of Time." The Army Air Forces presented a clear-cut description of how such a program has been actually put into practice, with an excellent discussion of the psychology involved by Lt. Col. John M. Murray. They seem to be far ahead of other branches of the armed services in this important field.

Dr. Kubie's paper on "Motivation and Rehabilitation" fulfills a long-felt need for a better understanding of the dynamics of recovery from illness. No worker in the field of rehabilitation should miss this paper. He discusses the meaning of injury or disease at the reality level, the level of conscious fantasy and feeling, and the level of unconscious fantasy and feeling. He shows that there is an optimal time for the beginning of a rehabilitation program, and that this time varies from patient to patient. The meaning of the disease or injury varies with individuals, he points out, and a corollary of this is that disease is not always a protection against the development of a neurosis. He divides the emotional reaction to a trauma into four phases, that of fear, that of emotional isolation, that of progressive loss of identification with the group, and that of regaining identification.

BRUCE MERRILL

Mayor's Committee on Marihuana: *The Marihuana Problem in the City of New York.* Lancaster, Jacques Cattell Press, 220 pp. $2.50.

Rumors about marihuana smoking amongst the population of New York led Mayor LaGuardia to request the New York Academy of Medicine to make a survey. This book is the excellent result of an excellent study.

The committee made a two-way report: It determined the extent of the use of marihuana and investigated the physical and psychological effects of the drug. The report includes an estimate of the number of addicts, the methods of distribution of the drug, the effect of marihuana on the smokers, the relationship between marihuana, sex and crime, and the correlation between marihuana and juvenile delinquency.

The sociological part of the study, by Dudley D. Shoenfeld, M. D., is pertinent, informative, courageous, free of prejudices and results in a surprising conclusion: Marihuana smokers are not given to criminality,

are friendly and sociable people, not necessarily bound to become drug addicts, may stop their habit voluntarily and withdraw without symptoms.

The clinical part of the book, especially in its psychiatric approach tries to be too "objective" and descriptive with the help of "quantitative measures." Little space is given to the understanding of the smoker and his habits. In the third and last part a careful pharmacological study of the drug is reported.

With better psychiatric cooperation this book could have been a landmark in cooperative research by a community conscious of its responsibility towards a problem of mental health.

MARTIN GROTJAHN

HOTCHKISS, ROBERT SHERMAN: *Fertility in Men*. Philadelphia, J. B. Lippincott Co., 1945, 216 pp. $3.50.

SIEGLER, SAMUEL L.: *Fertility in Women*. Philadelphia, J. B. Lippincott Co., 1945, 450 pp. $4.50.

These two companion volumes, published and sold together, are also integrated in their contents. The authors had a happy thought when the format of the two volumes was planned.

Dr. Siegler has put in book form an encyclopedic presentation of the problems connected with the study of barrenness in women. The book is complete, which is a proof of the author's clinical experience and an indication of the immense amount of work necessary to prepare a volume of this sort. The labor in its preparation is further exemplified by the extensive bibliography at the end of each chapter.

If my criticism were to include less complimentary statements, these would be that the book is too complete and its value lies in its position as a reference book for specialists in infertility only, rather than as a help to busy wartime obstetricians and gynecologists or least of all, general practitioners. Perhaps it is true that an increase in proportion of cures of infertility depends to a great degree on the thoroughness of the investigation. Certainly there are few of us today who have the time or a staff of case-workers who can take as complete a history as Dr. Siegler suggests, and if the average patient were to run the full gamut of tests, it would more times than not prove to be an economical hazard. The fact that there are points of philosophy and clinical practice which are incompatible with my own way of handling these cases does not make the book any less valuable. Chapter 7 on the "Tubal Factor" is particularly good and Chapter 9 on the "Treatment of Ovarian Imbalance" is particularly unsatisfying. I still hesitate to offer any patient much hope for the treatment of her sterility if the field has been covered and I arrive at the point where the only treatment remaining is irradiation, surgery, or "shots" even though the author admits their limited field of application.

At least a short chapter on the possibility of psychogenic factors in the problems of infertility should be included in a volume of this sort. Nothing else can explain the pregnancies that occur immediately following a physical examination only, the enormous number of conceptions after child adoptions, and the not infrequent results of telling the patient "Your examination shows no evident reason for your infertility, so go on home and get pregnant."

Dr. Hotchkiss has followed a similar outline in "Fertility in Men" and also refers the reader quite often to relevant discussions in the companion volume. Dr. Siegler makes the statement that "the production and delivery of sperm completes the reproductive function of the male." At first glance it seems like a very simple statement around which to develop a theme which ultimately reaches more than 200 pages in extent, but the book is a complete volume both as to actual content and copious bibliography. In several instances Dr. Hotchkiss mentions the importance of the psychological approach to sterility and offers an interesting chapter on the "Problems of Treatment," which though more inspirational than conclusive, can serve also as further proof that if the patient is willing, we as practitioners should continue to offer our aid and interest so long as a single possibility of help remains.

HOWARD C. WALSER

ROSENBURG, B. D.: *Special Delivery; the Expectant Mother's Handbook*. Illustrations by Gladys McHugh. Chicago, Ziff-Davis Publishing Co., 1944, 96 pp. $2.00.

This little volume of less than 100 pages was written with the express purpose of showing "by means of simple and direct language and by excellent illustrations, what does actually take place in this unnecessarily mysterious process of childbirth—and why."

The language is simple and direct, and the illustrations are factual and beautifully done. The book can be read easily in an hour and should be of value to the more inquisitive type of mother who is interested in learning something about the physiological and anatomical mysteries of child-bearing. There is a place for this volume, also, in the reading of students in Home Economics and so-called "Marriage Clinics."

I question its value for the average patient's use. Since upwards of three-fourths of all the obstetrical patients in the country are still being cared for by general practitioners, these same patients might find it difficult to reconcile the care they get and information they receive, with what they learn from "Special Delivery."

It is difficult for any writer on medical subjects, particularly when these subjects are written for the layman, to avoid dogma. Flat statements such as, "Twins should be delivered only by a certified obstetrical specialist"; that an admittance "Prep" includes the painting of the abdomen and thigh with an antiseptic solution; that the baby's eyes are stained for several days from the antiseptic solution used (many excellent hospitals still use stainless 1% Silver Nitrate); or that a very light diet the first few days is best; that a dry birth means that the first stage will be longer; all these and several others might cause feelings of insecurity to arise in patients whose experiences were, of necessity, different.

Naturally a book of this type to be read and understood, should be short and perhaps that is one of the reasons for certain omissions. For instance, the most frequent question asked me by patients is, "How big is my baby now?" And this occurs at any period during the nine months of pregnancy. A short description of the development of the embryo, I feel, would be particularly valuable.

Dr. Rosenburg, an officer in the Army Air Forces had not been certified as a specialist in the 1942 edition of the "Directory of Medical Specialists." He is said to have done extensive research on the psychological factors affecting his female patients. Perhaps when his patriotic efforts conflict less with his chosen profession, he will have more time to devote to the solution of those problems which are not approached in his first literary effort.

HOWARD C. WALSER

BOOK NOTES

ELSBERG, CHARLES A.: *The Story of a Hospital.* New York, Paul B. Hoeber, Inc., 1944, 145 pp. $3.50.

This is the story of the founding of the Neurological Institute of New York (1909) and of its development up to the year 1938, written by Charles Elsberg, who was associated with the institution from its beginning.

MARTIN GROTJAHN

MOORE, DOM THOMAS V.: *Personal Mental Hygiene.* New York, Grune & Stratton, 1944, 323 pp. $4.00.

Dom Moore, Professor of Psychiatry at the Catholic University of America, gives an outline of his psychiatric style, his philosophy and religion.

MARTIN GROTJAHN

RUE, CLARA BLANCHE: *The Public Health Nurse in the Community.* Philadelphia, W. B. Saunders Co., 1944, 283 pp. $2.50.

The field of public health nursing is outlined in this interesting and informative textbook.

MARTIN GROTJAHN

RUSSELL, W. L.: *The New York Hospital: A History of the Psychiatric Service, 1771-1936.* New York, Columbia University Press, 1945, 556 pp. $7.50.

Dr. Russell, Professor of Psychiatry at Cornell, has written a thoroughly exhaustive study covering both the Westchester Division (until a few years ago known as "Bloomingdale") and the Payne Whitney Clinic in New York City. One is struck by a singularly modern note in some of the case histories taken in the 18th century, and one obtains a fascinating picture of the New York of that period. The book as a whole is heavily weighted with the physical details of budgets, buildings, grounds, statistics, etc., almost to the exclusion of the history of psychiatric thought. There are passing references to the visits to the institution by such men as Schilder, Franz Alexander, Alfred Adler, and others, and only the briefest mention of the literature or psychiatric trends in the period covered. The history of an institution such as the New York Hospital is inseparably tied to the history of American psychiatry, but the story of that liaison remains to be written.

JOSEPH LANDER

SPURLING, R. GLEN: *Practical Neurological Diagnosis.* Springfield, Illinois, C. C. Thomas, Inc., 1944, 237 pp. $4.00.

By comparison with previous editions, the only important change the author introduces in the third edition is the complete revision of the section on myelography. The book is written in the form of a neurological examination, with a discussion of the significance of the findings at each step. In this fashion the medical student or general practitioner, for whom the text is apparently intended, comes to an understanding of the diagnostic significance of the findings as the examination unfolds.

There is practically no reference to the existence of an involuntary nervous system (aside from some of the basal ganglia) in spite of the fact that the autonomic functions exist at all levels of the central and peripheral nervous systems. Spurling's orientation, furthermore, is anatomical, but the student and the practitioner are at least equally in need of an understanding of neurophysiology. The author's dilemma may well have been the choice between a short and very simple examination outline, on the one hand, or a fuller but necessarily more complex presentation, on the other. Macewen's sign is today of less clinical importance to the practitioner than is an understanding of the regulatory control of gastric secretion.

JOSEPH LANDER

WECHSLER, I. S.: *The Neurologist's Point of View. Essays on Psychiatric and Other Subjects.* New York, Fisher, 1945, 251 pp. $3.00.

In a very personal, sincere and forthright manner, Wechsler gives an account of his "Weltanschauung." The Jewish question is especially emphasized and the psychology of anti-semitism is discussed in detail. A special chapter is devoted to Sigmund Freud and a second one to "Moses and Monotheism." Here Wechsler shows an unusual degree of intellectual and emotional understanding of psychoanalysis. Friends of the great neurologist will read this book with appreciation.

MARTIN GROTJAHN

BOOKS RECEIVED

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ELMER, MANUEL CONRAD: *The Sociology of the Family.* Boston, Ginn & Co., 1945, 541 pp. $3.75.

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KENDIG, M. (ED.): *Papers from the Second American Congress on General Semantics.* Chicago, Institute of General Semantics, 1943, 594 pp. $7.00. (Paper, $5.00.)

LEIGHTON, ALEXANDER H.: *The Governing of Men.* Princeton, N. J., Princeton University Press, 1945, 404 pp. $4.75.

LEIGHTON, ALEXANDER H., AND LEIGHTON, DOROTHEA C.: *The Navaho Door.* Cambridge, Harvard University Press, 1945, 141 pp. $4.00.

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PAGE, IRVINE H., AND CORCORAN, ARTHUR CURTIS: *Arterial Hypertension; Its Diagnosis and Treatment.* Chicago, Yearbook Publishers, 1945, 352 pp. $3.75.

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REIK, THEODOR: *The Unknown Murderer.* New York, Prentice-Hall, 1945.

RICHARDSON, HENRY B.: *Patients Have Families.* New York, the Commonwealth Fund, 1945, 394 pp. $3.00.

SELIGER, ROBERT V.: *A Guide on Alcoholism for Social Workers.* Baltimore, Alcoholism Publications, 1945, 94 pp. $2.00.

SHERMAN, MANDEL: *Intelligence and Its Deviations.* New York, The Ronald Press Company, 1945, 286 pp. $3.75.

SPURLING, R. G.: *Practical Neurological Diagnosis.* 3rd Edition. Springfield, Ill., C. C. Thomas, 1944, 230 pp. $4.00.

WEST, JAMES: *Plainville, U. S. A.* New York, Columbia University Press, 1945, 238 pp. $2.75.

POST-GRADUATE SEMINAR IN NEUROLOGY AND PSYCHIATRY

The eleventh Post-Graduate Seminar in Neurology and Psychiatry of the Metropolitan State Hospital, 475 Trapelo Road, Waltham, Massachusetts, will be held every Monday from October 1, 1945 to April 22, 1946 in three, two hour sessions from 2:00 to 10:00 p.m.

The program consists of 81, two hour lectures, demonstrations, and round table conferences in anatomy, applied physiology, pathology and roentgenology of the nervous system, clinical neurology, psychopathology and psychiatry. Graduate physicians may register October 1, 1945 at 1:30 p.m. at the Metropolitan State Hospital.

HORMONAL MODIFICATIONS OF SOCIAL BEHAVIOR

I. The Effect of Sex-Hormone Administration on the Social Status of a Male-Castrate Chimpanzee

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The question of domination-subordination hierarchies within a system of social relations has received extensive consideration by investigators ever since attention was sharply focused on the phenomenon by Schjelderup-Ebbe (12). Several lines of attack on the problem of dominance[1] have produced highly important information on the nature of inter-individual relations in societal groupings, and have indicated that, whether or not one agrees with the somewhat doubtful hypothesis that relations of domination are basic to, or inherent in, all types of social environment, the phenomenon is sufficiently widespread to warrant the close consideration of all students of animal aggregation. It is not necessary to demonstrate the existence, or the significance of dominance hierarchies in the social organization of most primates. The work of other investigators has already clearly established the fact of such an hierarchical structure as a characteristic form of organization for a number of primate species under the restricted conditions of captivity. The evidence from field study, however, is by no means so clearcut, and the report of Carpenter (1) on the howler-monkey (*Alouatta palliata*) indicates that, at least in that species, relations of dominance are either absent or relatively unimportant to social interaction under natural conditions. But, that social dominance hierarchies exist for all the primate species studied under conditions of captivity is a fact of behavior which has been indisputably demonstrated and, if it is realized that behavior is always conditioned by the environmental matrix in which it occurs, dominance behavior, though possibly an artifact of the conditions attendant upon captivity, (*e.g.*, restricted food supply, activity area, or limited mating opportunities, etc.) is nevertheless a behavioral manifestation the study of which is capable of shedding light on the societal potentialities of different organisms, and eventually may even yield data applicable to the problems of human social control.

The purpose of the present paper is to examine the basis in the physiological condition of an individual for the existence of domination over, or of subordination to, another individual in the course of social interaction. More specifically we are reporting the shifts in dominance-subordination status which obtained between two male chimpanzees when the sex hormone level of one of the members of the pair was systematically modified.

The effects of sexual status on dominance has been studied under controlled conditions in a number of species of lower animals, but for the primates observation has been limited to a consideration of the effects of autogenous changes in the female sex-cycle on social status by Zuckermann (18) for the baboon (*Papio hamadryas*), by Yerkes (16, 17), Nowlis (9), and Crawford (3) for the chimpanzee, and by Maslow (8) for a number of different primates, or to adventitious clinical observations on human subjects as typified by the reports of Pratt (11), one of whose patients reported a more marked penchant to argue with cab-drivers while under male sex-hormone therapy, and of Howard and Vest (5), who report that a boy 3½ years old behaved very aggressively toward his ward-mates while under male sex-hormone therapy, but who, when observed a year after cessation of treatment, seemed to be over-conciliatory, and over-solicitous ("mother-like") in his relations to his playmates.

When the experimental work on the infra-human primates is examined, it is interesting to note that all of the studies on the relation of sexual status to dominance have utilized the female of the species as the variable animal. Although the reason for such a pro-

[1] In discussions of social behavior, the definition of terms is essential if misunderstanding is to be avoided. *Dominance* in the present context refers to the existence of an inter-individual relationship in which response priority in a given *competitive situation* is achieved by one of the interacting individuals. The term is thus used specifically, and no inferences as to the establishment of an all-inclusive priority of response are intended. This stricture is especially important in the case of the chimpanzee because of the wide variety of social interbehavior in which trophallactic, non-competitive elements are of primary importance. Further, as has been demonstrated, clearly established priority of response in one type of competitive situation does not necessarily correlate highly with dominance in other competitive activities. One final point: dominance must not be confused with leadership, because as Katz and Toll (6), and Fischel (5) have shown with fowl, "peck-order" bears little or no predictive relation to the initiation of new activities, or the leading of the flock into unexplored territory, etc.

cedure is obvious in that it is the female which has certain readily observed morphological changes concomitant with modification of the sex-hormone level, it seems to involve two points of decided disadvantage. The first, and most readily apparent of these, is that adherence to such a method necessarily limits one to the consideration of only half of the available picture. The second shortcoming of the method is less obvious, and requires an examination of obtained inter-species differences for its elucidation. On the one hand, Zuckermann (18) in his study of the *Hamadryas* baboon found that as the female approached the point of greatest genital swelling and maximal sexual receptivity, a condition which coincides with the highest estrogen level, she became more subordinate than usual. Results similar to those of Zuckermann were reported by Maslow (8) for a miscellany of lower primates. On the other hand, investigators who have used the chimpanzee as the subject of their observations have obtained results quite different from those reported for the sub-anthropoids. In the chimpanzee the approach of the period of sexual receptivity is accompanied by an improvement in dominance status of the female, and on the basis of a series of tests it appears that in general the highest point reached by the female in the dominance hierarchy is concurrent with the height of her sexual swelling. Yerkes (16), who first reported on the relation of sexual status to dominance in the chimpanzee, referred to the shift in dominance as a "granting of privilege" by the dominant male to the subordinate female, presumably in return for the favor of sexual receptiveness, a concept not too far removed from the "prostitution" hypothesis of Kempf (7). However, the shifts in dominance status also occur in female-female relations in a manner quite similar to that which characterizes the inter-action among male-female pairings, and it is rather difficult to see how the granting of privilege concept is applicable in dominance shifts among females, unless we make the further assumption that the "privilege granting" behavior is conditioned in the female on the basis of her previous experience in heterosexual groups. Thus no consistent picture of the nature of the effects of even female sex-hormone level upon social status is available at the primate level, and any attempt at trans-species generalization of the manner in which social interrelations are conditioned by hormonal factors is rendered difficult, if not impossible, by the existence of inter-species differences which are probably the product not of the differential action of the hormone, but of the uncontrolled differential social matrix within which the hormonal effects are operative.

It was felt that some of the problems represented by the conflicting inter-species reports could be resolved by using a castrate male as an experimental subject. The use of a castrate has certain real advantages. In such an animal it is possible to control both the male and the female sex-hormone level at will; and further, the administration of estrogens is unaccompanied by the development of a genital swelling and thus the visible morphological change to which habits of social response may be attached is eliminated. The present paper, therefore, is a report of the effects of differential sex-hormone level upon the social behavior of a male castrate chimpanzee when paired with another male (intact) of the same species.

SUBJECTS

Don, a young-adult male prepubertal castrate, was available in the chimpanzee colony at the Yerkes Laboratories of Primate Biology. Two years before the start of the present experiment this animal had been subjected to a limited course of male sex-hormone therapy, and it had been demonstrated in a series of preliminary tests by Nowlis and Young (10) that his dominance status was improved under treatment. The treatment had been by implantation of pellets of testosterone propionate. The pellets were removed after remaining *in situ* for 30 days. All visible fragments were removed, and, as a further check on the completeness of the removal, an operation was performed one month later to obtain the encapsulating nodules of connective tissue which had formed in the region of the implant. Histological examination of the tissue showed no trace of any testosterone propionate.

The animal with whom Don was paired was Dick, another young-adult male (intact) who was approximately of the same size and weight as our castrate. The choice of Dick as the animal of comparison was predicated upon the following considerations: First, the choice of a partner for Don had to be limited to another male or to a castrate female, because any normal female would be unsuitable in virtue of her autogenous periodic changes in dominance associated with the sex-cycle. Second, the available female castrates were all so dominant to Don upon testing that it seemed unlikely that any perceptible modifications in the relationship could be evoked by hormone administration, especially since disparity in size and age between Don and the female castrates was significantly large. Finally, Dick was the only available male who was of approximately the same size and weight as Don, and who upon preliminary examination proved to be neither consistently dominant to nor subordinate to Don. Don was 9½ years old and Dick

was slightly older, 10¼ years at the start of the experiment. The animals were both of almost equal weight throughout the course of the experiment.

METHOD AND PROCEDURE

The test used for the determination of dominance status in the present study was a modification of the "pre-reward and test" procedure developed by Nowlis (9). In its original form Nowlis' method involved the granting of a free piece of food to one of the animals 10 seconds before the test or critical trial, with each partner being randomly pre-rewarded in ½ of the trials in the test series. Although the technique of pre-rewarding has certain real advantages over earlier methods in that it partially prevents excessive frustration, and the subsequent development of habits of non-responsiveness by the subordinate member of the competitive pair, the policy of *randomly pre-rewarding* one or the other of the competing animals introduces an undesirable artifact in behavior. That is, as Nowlis (9) puts it, "the subject who has just received the *pre-reward* was usually set for taking more food; interference with this set usually resulted in a fairly severe frustration response" (p. 187), and that the overcoming of such a disturbed partner was "a more difficult barrier than the simple physical interference created by juxtaposition of pre-rewarded partner and food-cup" (p. 188). It was felt by us that the advantages of the pre-reward method could be retained and its disadvantages eliminated by simultaneously rewarding both of the partners. Such simultaneous pre-rewarding was accomplished by means of a board 50 inches long to the ends of which two food-cups were attached. A peanut was placed in each of the cups and the board was held up against the wire mesh of the cage. Both competitors were thus able to obtain a *free* (non-competitive) nut before each critical trial. The *critical trials* were presented by replacing the *double-cup board* by a *single cup,* into which, in full view of the animals, another peanut, the *test-nut,* had been dropped. After the test-nut had been taken by one of the animals, the single cup was removed. Ten such pre-reward-test trials were given in close succession, and were followed by a rest period of from 5-15 minutes, after which a second series of 10 trials was run.

The method of pre-rewarding both of the partners before a test-trial seems to be superior to the method of random pre-reward of one or the other of the partners for the following reasons: First, the subordinate animal can take its pre-reward without interference from his partner, and without the aid of the experimenter, whose essential attitude of neutrality in the random pre-reward situation is necessarily modified by the need for shifting the position of the pre-reward to guarantee its receipt by the subordinate animal; an activity which in essence constitutes the formation of a social alliance between the subordinate animal and the experimenter against the dominant animal. Second, the differential advantage of preparatory set is eliminated. Third, no positional advantage is conveyed upon the pre-rewarded animal, and since both members of the pair tend to remain in position (50 inches apart) against the cage mesh, the test cup can be presented at a point equi-distant from both animals.

The animals were tested for dominance-subordination status under conditions of different sex-hormone level for the castrate. Methyl testosterone,[2] and alpha-estradiol, both of which are effective when taken orally were the drugs of choice, and the daily dosages during the periods of administration were 50 mg. and 2 mg. respectively for methyl testosterone and alpha estradiol.[3] Dominance tests were made at irregular intervals, usually of approximately one week's duration in each of eight periods of hormonal modification, and each test session included 20 *critical* trials, *i.e.,* single-cup trials. The series of tests and the order in which they occurred are presented in Table 1. The observations reported here refer only to dominance status; however, a series of other observations on other hormonal effects were also made and are reported by Clark (2) in another paper. The dominance tests were made over a period of 13 months, with the first test occurring on 11/15/43, and the last test being administered on 1/4/45.

RESULTS AND DISCUSSION

All the results of the dominance testing referred to in the following sections are available in Table 2, which summarizes the dominance scores for each of the eight testing periods. Since all of the scores are presented in the table, to avoid redundance in statement, the reader is asked to assume the words "as may be seen in Table 2" as a general preface to each numerical datum discussed in the text.

Period 1—The Pre-Treatment Test Series: During the five weeks immediately preceding the administration of hormone, the animals were given four food-competition sessions of 20 trials each. The results

[2] The methyl testosterone (Oreton-M) and alpha estradiol (Progynon-DH) were supplied in generous quantities by Dr. Max Gilbert of the Schering Corporation, Bloomfield, N. J.

[3] The dose of alpha estradiol is sufficient to cause maximal genital swelling in a castrate female, and the dose of methyl testosterone yields growth of the prostate and copulatory ejaculation in the castrate male (cf. Clark (2)).

indicated that the castrate, Don, was somewhat dominant to Dick, but that the dominance was by no means complete. In the total of eighty trials, 68% of the test peanuts were taken by Don and 32% by Dick; a difference which the application of the null hypothesis shows to be significant to the 2% level of confidence. Thus, before any hormone therapy, the castrate was significantly dominant over the intact animal, but not totally dominant since Dick consistently obtained some of the peanuts in every test session. The general behavior of the animals in the test situation, too, was indicative of a fluctuant, incompletely established dominance relation. Frequently, both animals would reach for the trial nut simultaneously and each have a finger in the presentation cup. Usually under such circumstances Dick would give precedence to Don. However, upon several occasions, Dick only relinquished the nut with ill grace, and screamed when Don took it into his possession. A brief account of the behavior during the course of the testing on 11/29/43 illustrates the point nicely. Don had been taking most of the nuts presented in the first five trials, and Dick, although he made no attempt to take a nut away from Don, screamed at each of Don's successes. On the sixth trial both animals tried to get the nut, and a minor scuffle limited to the region of the presentation cup expanded into a major battle when the nut was dislodged and fell from the cup. Don emerged as the victor in the struggle, but it is interesting to note that when all was peaceful once again and testing was resumed, the number of nuts taken in the last ten trials were 5 for Don and 5 for Dick.

Period 2—The Test Series with the Castrate Under Methyl Testosterone Therapy (50 mg./daily): The first test was made eight days after the administration of the first dose of male sex-hormone. In the four test sessions conducted over a four-week period, the castrate took 77 of the 80 trial nuts. In the last two sessions he took every trial nut and it seemed that a clearcut dominance relationship in favor of Don had been established under the condition of methyl-testosterone therapy. The development of the relationship was not automatic, but was at least partly the product of a fight which occurred during the first session of this period. In the first trial Dick got the peanut, but this was in part a product of preferential position. On the second trial, both animals went after the nut simultaneously and a sharp battle ensued in the course of which the animals struck and bit at each other. Don, the castrate, clearly emerged as the victor; however, in the course of the struggle his lower left canine had been torn loose, and while he was occupied in rubbing the dangling tooth on the wire mesh of the cage, Dick took the nut over the possession of which the battle had been waged. In the next eighteen trials of the test session, however, Don took every trial nut, a result in marked contrast to the behavior which had ensued after the fight described in period 1. Further, Dick developed a new response to the test situation after the fight. After getting his "free" peanut in the pre-reward presentation, he would immediately retire to the rear of the cage and leave Don in undisputed possession of the testing area. After Don took the trial-nut, and when Dick saw the cups of the "free" nut board being reloaded, he would return to the front-mesh of the cage and eagerly await and accept his pre-reward.

In the second testing session of the methyl testosterone period, Dick once again obtained the first test nut. This, however, was because the experimenter had deliberately presented the single-cup so that it was much closer to Dick than it was to Don. On the second test-trial the nut was once again presented so that it was nearer to Dick than to Don, but on this occasion Don moved over toward Dick, who at once

TABLE 1

SCHEDULE OF EXPERIMENTATION

Period	Hormone administered	Begun	Ended	Social status of Don at start of period
1	None	11/15/43	12/22/43	
2	Methyl testosterone * 50 mg./day	12/23/43	1/25/44	Dominant
3	None	1/26/44	7/23/44	Dominant
4	Alpha estradiol * 2 mg./day	7/24/44	8/23/44	Subordinate
5	None	8/24/44	10/11/44	Subordinate
6	Methyl testosterone 50 mg./day	10/12/44	11/22/44	Subordinate
7	None	11/23/44	12/ 6/44	Dominant
8	Alpha estradiol 2 mg./day	12/ 7/44	1/ 4/45	Dominant

* Administered in the form of Oreton-M., and Progynon-D.H. products of Schering Corporation, Bloomfield, N. J.

retired to the rear of the cage and left Don in possession of the nut. In the succeeding 58 trials during three test sessions, Dick at no time made any attempt at getting the trial-nut; despite the fact that he received and ate his free pre-rewards with evident enjoyment. At each presentation of the pre-reward, both animals would take their nuts and eat, but as soon as the single-cup was presented, Dick would depart from the field of action and leave Don in undisputed possession. Clearly, since he always returned and took his pre-reward, Dick's precipitant retreats were not the product of a lack of food motivation, but of the establishment of a system of social relations in which he was the subordinate animal, and in which precedence in response, therefore, belonged to Don.

TABLE 2

RESULTS

Period	Date of dominance tests	Scores Don	Scores Dick
1 No hormone	11/15/43	14	6
	11/29/43	11	9
	12/ 2/43	15	5
	12/22/43	14	6
2 Methyl testosterone 59 mg/day	12/31/43	18	2
	1/ 7/44	19	1
	1/18/44	20	0
	1/25/44	20	0
3 No hormone	2/25/44	19	1
	4/11/44	20	0
	4/18/44	20	0
	6/13/44	0	20 *
	7/14/44	16	4
	7/17/44	20	0
	7/17/44	0	20 *
	7/19/44	0	20 *
	7/21/44	0	20 *
4 Alpha estradiol 2 mg./day	8/ 4/44	0	40*
	8/ 8/44	0	20 *
	8/17/44	0	20 *
	8/17/44	13	7
	8/17/44	0	20
	8/18/44	0	20
	8/24/44	0	20
5 No hormone	10/12/44	0	20
	10/22/44	0	20 *
6 Methyl testosterone 50 mg./day	10/26/44	0	20 *
	10/26/44	8	12
	11/ 2/44	0	20 *
	11/ 2/44	0	20
	11/ 2/44	20	0
	11/ 2/44	17	3 *
	11/ 9/44	16	4 *
	11/16/44	20	0 *
7 No hormone	11/23/44	20	0 *
	11/30/44	20	0 *
	12/ 7/44	20	0 *
8 Alpha estradiol 2 mg./day	12/15/44	20	0 *
	12/21/44	20	0 *
	12/28/44	3	17 *
	1/ 4/45	0	20 *

* All asterisk scores refer to tests given in Cage M 2.

Period 3—The Post-Methyl Testosterone Control Period: The administration of methyl testosterone was discontinued on 1/26/44, and the first dominance tests of the control (non-hormone) period were made one month subsequent to the cessation of therapy, 2/25/44. On this test Don was unquestionably dominant over Dick (Score=19 to 1), and in the last ten test trials Dick made only one attempt at getting the nut. He reached into the cup with his tongue, and Don calmly reached his hand beneath Dick's chin, took the nut and ate it. Dick made no active attempt at attack, and Don seemed to ignore Dick's bared teeth and scream while making the successful reach into the cup.

Another six weeks went by before the animals were tested once again. It was felt that, perhaps, the first interval between cessation of treatment and testing had been too short to obviate the effects of the hormone on the castrate. However, upon testing again on 4/11/44 it was found that the dominance relationship that had existed in the prior test was still fully in force, and the castrate took the trial-nut on each of the twenty test trials. These results occurring as they did after an interval presumably long enough to effect the disappearance of any persistent effect of the male sex-therapy, caused us to believe that the persistence of the dominance pattern was not due to the continued action of the hormone, but to the retention of well-fixated habits of social response established during the period of hormone therapy. To test this hypothesis it was decided to introduce a change in social milieu and to cage the castrate, Don, with another intact male, Tom, who was much heavier (12 kg.), a year and one-half older, very greedy for food, and decidedly dominant over Don (Test score=20 for Tom, 0 for Don). After Don had lived as a subordinate to Tom for a week, a series of test-trials were once again run between Don and Dick. The caging of Don with Tom did not yield any change in the Dick-Don relationship, and the score for the test (4/18/44) was 20 to 0 in favor of the castrate. This result was not unexpected because, although Tom had been decidedly dominant to Don during the week of their cohabitation, Dick, who was caged separately, played no rôle in this new relationship and so the possibility of the Don-

Tom relationship affecting a reversal in the Don-Dick relationship was remote, both from the standpoint of the laws of habit formation, and from the viewpoint of other evidence on dominance relationships among primates.

It was decided, therefore, that if the established dominance pattern were to be reversed, or in any way modified by new social influences, it would be necessary to have both Don and Dick as members of the new social group. Consequently, for the next two months no tests were given, and Dick, Don and Tom lived together in a single cage. In the new social triumvirate Don was more or less the outcast. Usually upon daily observation, Dick and Tom could be seen together in one section of the cage, while Don would be sitting or playing by himself at some distance from his two cage-mates. Tom was clearly the dominant animal in the group through the entire period. After the animals had lived together for two months, Don and Dick were once again tested (6/13/44) as to their dominance-subordination relation. The test showed a complete reversal in favor of Dick, with the score 20 to 0 in his favor. However, the test had been conducted in cage M 2, the same cage in which the trio of animals had been living, and although the dominance relationship had clearly suffered a reversal, further data were needed to obtain an understanding of the reliability and degree of generality of the change in status. As a result, another test was run one month later (during the interval the trio of animals had been living together in cage M 2), and the test trials were administered in cage Q 7, which was in a different building from the home residence. In the strange (non-residence) cage (7/14/44) it was found that the castrate had not lost his position of dominance over Dick, with the test score 16 to 4 in Don's favor. Three days later (7/17/44) on a retest in Q 7, the dominance status of the castrate was maintained, with the test score 20 to 0 in his favor. However, upon immediate re-testing in the home cage (M 2) the dominance relation shifted completely and Dick was clearly dominant over Don with the score 20 to 0 in favor of the intact animal. Upon two subsequent occasions (7/19/44 and 7/21/44) retests in M 2 showed a persistence of Dick's dominance. Thus at the conclusion of the non-treatment period, an equivocal dominance-subordination relationship existed between the two animals; in one cage (M 2) which had certain experiential attributes for the animals, the dominance position in the pair was clearly held by the intact animal, and in another cage in which neither of the animals had had any previous social experiences the reverse positional relation held true.

Period 4—The Administration of Female Sex Hormone to the Castrate: The daily administration of alpha estradiol was begun on 7/24/44, in order to determine the effects of female sex-hormone on the equivocal dominance relationship. In the first tests of dominance, which were conducted in M 2, Dick maintained his dominance over Don. When the test was given in Q 7, the larger portion of the nuts went to Don, but Dick took two of the nuts in the first 10 trials, and five of the nuts in the second half of the 20-trial series. At no time did either animal make any sign of protest when the other took the proffered food. Dick, it seemed, was emboldened by his success in getting some trial nuts in Q 7, and in subsequent trials, broke completely with his old habit of subordination in that cage, and thereafter took every nut with no interference from Don even when the trial nut was presented so that it was much closer to Don than to Dick. The fact that Don eagerly accepted and ate the "free" nuts indicated that his non-interference with Dick on the competition-trials was not simply a result of a lack of food motivation, but was a true reversal from his position of dominant animal to the acceptance of the rôle of the subordinate member of the pair. A further check on this conclusion was provided by testing Don with two young females immediately after he had made no attempt to interfere with Dick's appropriations of the trial nuts on 8/18/44. Don was clearly dominant over the females and in one case he took all of the 20 trial nuts, and in the other, 19 of the 20 trial nuts. Thus the change in relation to Dick was not the product of lowered food motivation but was a reversal in dominance status under hormone administration.

Although it was felt that the obtained changes in social status were the results of the hormonal modifications, this could not be an unequivocal conclusion, because in both instances of dominance shift the hormone administrations had served to reinforce rather than to reverse an already existent state of affairs. That is: the methyl testosterone was given to Don when he was already significantly dominant to Dick, and the alpha estradiol was administered when Don was already moving in the direction of assuming the position of subordinate in the pair. Thus, it was impossible to decide conclusively whether the obtained results represented modifications of behavior which were produced by the hormone therapy, or were merely autogenous fluctuations in status which would have occurred even if the hormone had not been given to the castrate. The next four periods of experimentation were designed to serve as a check on the doubtful element existing in the first experimental periods. In these four final periods of experimentation, methyl

testosterone was given when the castrate was clearly the subordinate member of the pair, and alpha estradiol was introduced when the castrate was clearly the dominant individual. Under such conditions, a reversal in dominance status under hormone therapy would serve to exclude the factor of autogenous fluctuation as a relevant influence on the behavioral modifications which appeared during hormone administration. Consequently, a second series of tests were begun six weeks after cessation of the alpha estradiol therapy.

Period 5—Post-Alpha Estradiol Control Series: It will be recalled that at the close of the period of female sex-hormone administration, the castrate was the subordinate member of the pair when tests were made both in the home cage (M 2) and in the non-residence cage (Q 7). On 10/12/44 dominance tests were conducted in both cages and the results obtained indicated that Dick, the intact animal, had maintained the position of dominance, which he had acquired during period 4, with the scores 20 to 0 in his favor in both cage tests.

Period 6—Methyl Testosterone Control Series: Administration of methyl testosterone (50 mg./day) was begun immediately after the conclusion of the tests in period 5. Tests of dominance status were begun on 10/26/44, two weeks after the introduction of the male sex-hormone. Tests in the home cage (M 2) showed no shift in social status, score 20 to 0 in favor of Dick. However, tests made in the "strange" cage (Q 7) showed that Dick's position was beginning to deteriorate, and that the dominance-subordination relation between the animals was entering into a condition of flux. Dick was still dominant, but not completely so, with Don taking 8 of the 20 test-nuts. The general behavior of the subjects in the Q 7 tests is a more revealing index of shifting status than is the score. On the tenth trial, Don who had previously made no attempts at taking the test-nut reached out and grabbed the peanut with no interference from Dick. After this initial success, Don became increasingly confident and took 7 of the nuts in the last 10 trials, and Dick, upon seizing the nut on the last (20th) trial, ran hastily away from the testing site.

Testosterone therapy was continued, and the animals were again tested one week later, on 11/2/44. A first set of 20 trials was given in the home cage, and Dick took all of the trial-nuts. On the second set of 20 trials given in Q 7, Dick repeated his performance, and once again took all of the nuts. However, Don, though he made no attempt to interfere with Dick, showed signs of interest in the test-nuts and it was decided to run another series of 20 trials at once. In the set of trials, Don took every nut. Upon one occasion (trial 10) Dick made an attempt to seize the nut, but desisted at once when Don gave vent to a low cry. It seemed that we had been fortunate enough to make our tests on the very day in which a sharp reversal in social status was occurring, and it was decided to run another series of trials in M 2 after an interval of several hours. In this series of trials, Dick took the first nut with no interference from Don. However, on the second trial Don took the nut, and when Dick protested vocally, Don launched a brief attack which ended abruptly when Dick left the field of action and made threats at a female living in an adjacent cage. In the remaining 18 trials, Don took 16 and Dick 2 of the test-nuts. Both of the animals remained in the test area, and showed signs of annoyance when the other obtained the test-nuts.

One week later, 11/9/44, another set of tests was given in the home cage (M 2), and Dick took the first 3 test-nuts. On the fourth trial, both animals reached for the nut, and a battle which resulted in a victory for Don took place. Dick, however, took the fifth nut, which had intentionally been placed nearer to him. Thereafter, Don took all of the nuts regardless of their proximity to Dick, who from the eleventh trial onward developed the pattern of accepting the free-nut and then turning his back on the single-cup situation, a mode of behavior which left Don with uncontested access to the test-nut. A re-test in M 2 on 11/16/44 resulted in a clearcut demonstration of Don's dominance, and methyl testosterone administration was discontinued.

Period 7—The Post Methyl Testosterone Control Period: This period was of three weeks duration, and in the course of it the castrate retained his dominant social position, with no opposition from Dick. Even when the trial-nut was presented directly to Dick, Don would calmly reach for it and take it without interference, even though at times such reaches involved moving his hand to within two inches of Dick's mouth. Don took every one of the trial-nuts in the course of the three weekly test sessions. All tests during this period were conducted in M 2, the cage in which Dick had certain traditional advantages, a fact which indirectly indicates the strength of Don's dominance position.

Period 8—The Period of Female Sex-Hormone Therapy: The treatment of the castrate was begun when he was clearly dominant to Dick, and tests of dominance-subordination were made at weekly intervals. After three weeks of alpha estradiol therapy the dominance relations were reversed, with Dick taking 17 of the 20 trial-nuts. By the fourth week of treatment Don had become completely subordinate, with Dick

demonstrating his dominant status by taking all the test-nuts on the 1/4/45 series of trials.

SOME TENTATIVE HYPOTHESES

Several questions are raised by the results obtained in the present experiment. To begin with, the raising of the estrogen level of the castrate male chimpanzee yields an effect on his social status which is the very opposite of that which is produced when a rise in estrogen level takes place in an intact female of the same species. Whereas in the female the rise in hormone level is accompanied by an increase in dominance, in the male-castrate the administration of female sex-hormone produces a decrease in dominance, and even a reversal in social status which causes the previously dominant castrate to become subordinate to his partner. An unequivocal explanation of the contraposed effects of female sex-hormone level on the social status of the male-castrate and of the intact female is not possible at our present level of knowledge. However, it is possible to advance certain alternative hypotheses, some of which are capable of being tested experimentally.

If it is assumed, as is usually done ever since Steinach (13), that the behavioral effects of hormone level arise as a result of the selective modification of certain patterns of neural activity, the differential effects of the estrogen on the behavior of the male-castrate, and the intact female may be interpreted in terms of sexually determined differences in brain chemistry. Such an attempted explanatory hypothesis is untestable at the present level of technique, and depends for its acceptance on the assumptive extrapolation of certain minor indications of sex-difference in brain chemistry such as were reported by Weil (14), and Weil and Liebert (15), or upon the experimental elimination of all other possible causes of difference in hormone effect. As yet, the information available does not warrant the uncritical acceptance of this hypothesis.

A second and testable hypothesis is that the increase in dominance concomitant with rise in hormone level in the intact female is not the directly produced effect of the hormone, but is a secondary effect arising out of certain somatic changes which occur as a result of the cyclical fluctuations in estrogen concentration. As the estrogen level rises in the female, her genitalia swell enormously with the skin in the sexual area becoming stretched and irritated. Normal patterns of sitting and repose are no longer possible, and the general activity of the animal is increased. It is possible that the irritated condition of the genitalia and the increased general tonus of the animal increase its irrascibility, or in other terms, lower its threshold of aggressiveness, and so produce behavioral manifestations which are the very reverse of those which would occur if rise in hormone level were to take place without such peripheral changes, the state of affairs which existed for our castrate subject. Work is already under way for testing this hypothesis, by means of studying effects of change in estrogen level on the behavior of females in whom genital swelling is prevented.

The third hypothesis which can account for the differences in the dominance effect of estrogen in our castrate and the intact female is the "granting of privilege" concept. In this case, however, the change in social dominance is not the product of the effect of estrogen on the female, but is an effect produced by the manner in which her sexual receptivity modified the behavior tendencies of the animals with which she is paired. It is important to note that upon the adoption of this hypothesis one is no longer speaking of the effects of hormone level upon the behavior of the animal whose hormonal state has been modified, but of the effective modification of the responses of the animals with whom the variable female is associated, by virtue of their perception of alterations in her state of sexual receptivity and general behavior. This hypothesis, too, is testable, and a current investigation is concerned with the determination of its validity.

At present our information on the mechanism involved in the hormonal modification of behavior is too scant to permit the drawing of final conclusions. However, the deleterious effect of the female sex-hormone on the dominance status of the castrate male chimpanzee seems to warrant the tentative conclusion that the differences which have been found to exist between the chimpanzee and other primate species in relation to the question of sexual status and dominance are the products not of differential hormonal action, but of other factors as yet only sketchily perceived.

SUMMARY AND CONCLUSIONS

The effects of male and female sex-hormone administration on the dominance status of a male-castrate were studied in a food-competition situation. The animal with which the castrate was paired was an intact male of approximately the same size and age as the treated subject. The results showed:

(1) That the dominance status of the castrate was enhanced by male sex-hormone therapy.

(2) That the castrate assumed subordinate status as a result of the administration of female sex-hormone.

(3) That well-established habits of social response were acquired by the animals, and tended to persist after cessation of hormone administration.

(4) That the persistent habits of response could be modified and eventually reversed by appropriate hormone treatment.

The results were discussed in connection with the general problem of social dominance; and several hypotheses as to the nature of the mechanism underlying the effects of sex-hormones on the social interactions of the chimpanzee were considered.

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SLEEP PARALYSIS AND COMBAT FATIGUE *

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In the substantial literature on the subject of operational or combat fatigue, little mention has been made of such conditions as sleep paralysis, cataplexy or narcolepsy. Grinker and Spiegel (3) in their "War Neuroses in North Africa" report no incident of such symptoms despite the fact that one of the characteristics of operational fatigue is marked sleep disturbances. Hastings, Wright and Glueck (4) fail to mention sleep paralysis in their extensive report on psychiatric experiences with the 8th Air Force. The only mention of sleep paralysis in military psychiatry is in Crofton's report on abnormalities of sleep (2). He states that such conditions as hypersomnia, narcolepsy, cataplexy, hypnogogic hallucination, and sleep paralysis (being most often an independent manifestation) are admissible medical evidence to vitiate disciplinary action for falling asleep on duty.

Sleep paralysis has been defined as a state in which consciousness is awake while motor functions are asleep. It occurs when the patient is just about to fall asleep or on waking up. The patient is unable to move any part of the body and usually experiences a strong feeling of anxiety. This unpleasant state lasts from a few seconds to a few minutes and a touch may be enough to dissipate it, though usually it disappears spontaneously. In our work with returnees suffering from operational fatigue, we have observed three patients with sleep paralysis. This symptom evidently had been precipitated by factors directly related to combat but on further study proved to be related to the character and personality conflicts of the patients.

CASE REPORTS

CASE 1: The patient was a 23-year-old aerial gunner with three years of military service. As a tail gunner on a heavy bomber he completed 25 missions in a Theater of Operations during a period of 11 months. Most of his missions were so severe that at the completion of his tour of combat only two of his original crew members survived. On his third mission the patient was wounded by flak and another gunner was killed. The engineer was so badly injured that it was necessary to drop him over enemy territory for medical attention, praying that his parachute would safeguard his landing. On landing at the base, a crash resulted in the death of the pilot. Finally, on his 22d mission, a safe landing at the base could not be made, and the whole crew had to bail out. Thereafter, the patient developed such marked nervousness that he was sent to a rest-home for a time, but only with the greatest of difficulty and effort was he subsequently able to make three more missions. When he returned to the United States because of his marked aero-anxiety he refused an opportunity to fly home, nor was he willing to travel by plane during his overseas furlough.

He did not enjoy his stay at home, and was very restless and irritable. He had frequent dreams of combat and slept poorly. Upon his return to duty he was temporarily suspended from flying. The adjustment to his new environment was difficult, for he did not like the particular field nor the monotonous duties to which he was assigned. He continued to be irritable, and found himself unable to conform to the discipline which was thrust upon him. During this time he was extremely restless and continually on the move. He lost weight and slept poorly. The only thing that made him feel free and gay, as he had been before he went overseas, was alcohol, which he imbibed freely. Furthermore, he found a great deal of relaxation and reassurance in friendly relations with a member of the WAC stationed at the same field. It was through her influence that the patient developed insight enough to consult a psychiatrist, who arranged for the patient's admission to the AAF Convalescent Hospital, St. Petersburg, Florida, about 10 months after his arrival in the United States.

On admission he was found to be a pleasant, attractive looking and intelligent young man, tense and restless in his behavior; there was a marked fine tremor of the hands and excessive perspiration. Except for a slight proptosis of the left eye and a congenital asymmetry of the face, the physical and neurological examinations were completely negative as were x-ray studies of the skull and laboratory studies (including blood sugar). There was evidence of a depressed state of mood and an obvious reluctance to discuss combat experiences.

The patient came from a middle-class family of three children; a brother, who suffered from asthma, was three years older, and a sister, nine years younger than the patient. The father was a contractor who drank heavily in the past; the mother was described as a nervous individual who had recently developed heart disease and whose uncontrolled emotional expressions were quite disturbing to the patient when he returned

* From the AAF Convalescent Hospital Don Ce-Sar, St. Petersburg, Florida.

from overseas. She waited on him in such an affectionate way and told him so often how happy she was to have her son back, that he finally cut his furlough short in order to escape this situation in which he was so much the center of attention. In this connection, discussion of his childhood revealed a period of withdrawal from a heretofore close attachment to his mother, after the birth of the younger sister. During his high school period the patient liked to be away from home, and he described himself as gregarious and of the happy-go-lucky type, with many friends, none of whom, however, he could call very close. After graduation he had several jobs, most of brief duration, and he was on the move continuously until finally he was drafted into the Army.

Since the age of 17 he had had occasional sexual relationships, all invested with no real affection and transient in nature. It was learned that at the time of puberty he had been the victim of a homosexual approach, which he had managed to escape in great fear. During his overseas service, a similar incident occurred and at that time he reacted with extreme violence, hitting the aggressor so severely that he wondered whether he had killed the man. After this disturbing experience, he increasingly developed the habit of "being on guard."

During his psychotherapy, the patient slowly learned to express himself freely about his experiences in combat and concerning the extreme anxiety he had gone through. He bitterly complained of the frustration he had felt when, on his return to the United States, he had failed to adjust, and of his feeling of uselessness for further service. He felt deprived of the excitation that combat had given him, and began to wonder whether he could do better in civilian life. It became evident that his anxiety and ineffectiveness led to irritability and a hostile, criticizing attitude toward authority and the world in general. However, his WAC girl-friend could give him the understanding and affection he needed. For the first time in his life he experienced a feeling of sincere attachment, and he began to consider marriage, much stimulated toward this goal by his partner. Simultaneously, however, he felt strong doubts as to whether he would be able to control his urges to drift around and to avoid responsibility. The high hopes of his girl-friend made him wonder whether he should disappoint her now, or, take a chance on such a probability later.

Sleep paralysis developed at the time of this conflict. Prior to falling asleep, or upon awakening, the patient, with clear consciousness, suddenly found himself unable to move his extremities and his head. In addition, there was complete paralysis of phonation. During a period of about five minutes, he lay in bed with a feeling of complete helplessness and intense anxiety. All he could do was move his eyes and look around. Often these attacks were preceded by a "funny" feeling in the region of the stomach, which spread towards the chest and shoulders. Occasional dreams of combat and other anxiety dreams were not directly related to the occurrence of the sleep paralysis. Unfortunately, the patient could never be observed during these attacks from which he always recovered immediately, and which left him with the painful awareness that something was fundamentally wrong with him. His spontaneous and quite correct interpretation was: "See, I can't even sleep in a normal way—my body and mind don't work together—I've lost control of even these primitive functions—I don't know what to do—I give up."

In the course of treatment the patient became reoriented about his personality difficulties and conflicts, and his reaction to the stresses of the recent past. He learned to understand his dependent needs and his protest against them. He had really never known whether he should be fearful or aggressive, and, neither attitude ever dominated his actions in any marked degree. After some time the patient was able to see that he had always avoided an emotionally dependent attachment to women, similar to his tendency to keep at a distance from his mother. He finally decided that even if he were to be separated from the Army (on medical grounds, as indeed happened), he would not be sufficiently stable to marry; therefore, he broke off relations with his girl. From that moment on attacks of sleep paralysis ceased. He continued to improve clinically, and remained without further hostile and depressive manifestations.

In summary, this flyer, whose past points to neurotic character-difficulties, on his return was overwhelmed with a complex situation of persistent combat anxiety, increased dependent needs, and reactive protest against these changes. A love affair increased his indecisiveness and confusion to a climax at which time sleep paralysis occurred. Re-integration of the personality, so far as was possible with superficial psychotherapy, resulted in disappearance of this abnormality of sleep.

Case 2: The patient was a 23-year-old B-17 radio operator who, during the months of May to August 1944, completed 30 missions in a Theater of Operations. Despite the fact that he was frightened on his very first mission, following which he developed nervousness, tenseness, and combat dreams, he continued to fly until he had completed an entire tour of duty. All of his missions were "tough" assignments, and he and his crew underwent severe battle experiences. His symptoms gradually increased; he developed restless-

ness, irritability, severe startle reaction, lost weight, and, after the 13th or 15th mission, developed sleep paralysis. He described this symptom which occurred about twice weekly, as, "paralyzing dreams." Just before falling asleep, he had a feeling of helplessness. Unable to move any part of his body, he would like to call out for help, but could not talk. He had the feeling that something dreadful was going to happen, but he usually "gets out of it" spontaneously and safely. While he often thought of quitting combat flying, he nevertheless could not bring himself to do so, as he did not wish to abandon his crew and his pilot.

His family history revealed that his father had been separated from his mother since the patient was 13 years of age. He described him as being a "good egg," but a very heavy drinker, which caused the separation from his wife. The patient described the father's behavior toward him as being unpredictable, either lenient or very strict, forgiving and punishing in turn. While he recently understood his father better and forgave his behavior, nevertheless, on his last furlough home, he actually struck his father, because the latter, in his drunkenness, was creating a scene. His mother suffered a nervous breakdown in 1940, apparently related to involutional changes for which she was still being treated. She was an independent and opinionated person, but the patient was on excellent terms with her. He was the youngest of five siblings, all of whom were alive and got along well with each other. Economically, the family was always on a marginal basis, so that he had to shift for himself early in life. Other than his mother's nervous breakdown, he gave no history of mental disease or epilepsy in the family.

His development had been normal, and his personal history revealed nothing unusual. He started school at five, and was graduated from high school at 17. Enuresis, nail-biting, or any other factor that would point to early maladjustment, was denied. Although the patient's jobs had been varied he worked steadily and had a good record.

Sexual development was normal; he masturbated early in puberty, and only sporadically, after his first heterosexual experience at the age of 15. In 1942 he decided to enlist in the Army because the draft board was: "Hot on my neck." Objectively, he presented himself as a tall, rather handsome, somewhat depressed individual, who was reticent in discussing his difficulties. Despite all the symptoms presented, the patient's chief concern was over his feelings of inferiority and indecisiveness. He claimed that he was worried because he was never able to make up his mind. Any decision would be debated in his own mind at such length that he would lose sight of the original issue. As an example, he gave the fact that he would debate so long as to whether he should go into town or remain in the hospital, that he never actually got to town. He described himself as a mean character, with a desire to hurt people, not physically, but mentally. In his relationship with human beings he liked to make conquests. The seemingly sadistic idea behind it was to make such conquests, and then laugh at the victims. He was distrustful of people, and believed that he always had to make his own way as, in truth he did, since his father abandoned his family and the patient had to shift for himself.

The precipitating factors for the sleep paralysis occurred in combat. At about his 13th mission, he had a quarrel with his pilot whom he greatly respected, and, with whom he was on excellent terms. He felt that he could trust implicitly this pilot who would never abandon his crew. On the 13th mission they encountered heavy flak and fighter opposition, and were forced to fall behind the formation. Falling behind the formation is tantamount to destruction, for the enemy opposition looks for the opportunity to pounce upon stragglers. He urged his pilot to catch up with the formation. It was rather obvious that the pilot was unable to do so. They exchange angry words as they were both excited, the pilot eventually telling the patient that if he did not like the way he was flying the ship, he could fly with someone else. The patient stated he had a feeling of helplessness and rage, but kept quiet, as he was unable to retaliate. Eventually, both men "forgot" the incident.

During the course of this "uncovering" therapy the patient showed much improvement. The episodes of sleep paralysis became less numerous. He was returned to duty, but suspended from further flying.

In summary, we have a very indecisive individual, aggressive in intent, but docile in action. In his daily activities he unconsciously debated before action. His sleep paralysis was probably a somatic expression of his psychic helplessness.

Case 3: The patient was a 27-year-old aircraft inspector who had spent 33½ months in a Theater of Operations. Though he was a member of the ground personnel, his job required him to fly from base to base. Always nervous and high-strung, his present symptoms dated from the time he was involved in an air crash, about two years prior to hospitalization. On that occasion he flew with a young, cocky pilot, who took off despite a heavy fog. They were soon lost and narrowly escaped hitting a mountainside. Finally, when they ran out of gas, they were forced to crash-land. The patient was very frightened and, since that time, had been nervous, irritable, sleepless, stuttering, and uncertain of his ability to carry on

with his work. After being subjected to numerous bombing raids, his anxiety increased so much, that any enemy formation, bound for his or any other base, threw him into a panic. Eventually he was hospitalized and returned to the United States as a psychiatric casualty. Despite his fear of flying, he was ordered to return to the United States by air. His anger and rebellion were so intense, that on his return home, he failed to report back to duty, and considered AWOL. When he eventually reported for duty he was court-martialed, given a month in the guard house, and reduced from the rank of staff sergeant to that of a private.

Overseas, the patient noticed the first signs of sleep paralysis. This symptom occurred on awakening, when he would find himself in a helpless state, unable to move his arms or legs, accompanied by a feeling of marked anxiety. He would try to call out for help but was unable to do so. He was able to move his eyes, but then a peculiar sensation, like an electric wave, began at his eyes and moved down to his toes. The condition lasted for a few minutes and then spontaneously disappeared.

The patient's history disclosed that his mother, whom he did not remember, died of pulmonary tuberculosis when he was four years of age. His father, 57 years of age, was a disciplinarian, strict in his demands, and, when drunk, was "mean" to members of his family. The father remarried when the patient was eight years of age. The patient's relationship with his step-mother and his two siblings, a brother and sister, had been good. His brother was raised by his aunt, while he and his sister remained with the father and step-mother. He described himself as a shy person, who did not mingle too well or participate in any sports, and who had no particular hobby. There was no history of convulsive seizures or nail-biting in his personal life. Occasional enuresis had bothered him all his life, and even to this time occurred every once in a while. He completed grade school with average grades. In his first year of high school, at the age of 16, he ran away from both school and home. Although he stated that he ran away because he slapped one of the teachers, one can surmise that his flight was directed more against his father than against the school. Two years later he returned home and worked for his father who was a contractor, until he was drafted into the Service. His record in the Service had been good, in that he was a good, obedient soldier who managed to avoid any difficulty. On numerous occasions his deeds had been heroic, despite his aversion to blood and the sight of injured men involved in plane crashes.

During his stay in this hospital, the patient presented himself as a submissive and obedient character who voiced no resentments and showed no disrespect for officers. However, investigation under pentothal uncovered in him a great deal of resentment and anger against officers, and in particular, he blamed his pilot's superior attitude for the airplane crash. At the same time, he showed his conflict by being apologetic for calling the officers names. While he did not stammer during ordinary interviews, under pentothal he began to stammer, particularly when speaking of the pilot and the officer who ordered him to return to the United States by plane. He also complained of his indecisiveness and lack of efficiency during the latter part of his overseas duty. Although he admitted the justice of his court-martial, he was nevertheless, extremely resentful. The patient showed some improvement under treatment, but his sleep paralysis continued, and his eventual return to duty was questionable.

In summary, we found a submissive indecisive individual with innate aggressive tendencies. His defenses against his aggressions were manifold. He either ran away from the situation or responded in a submissive, docile manner, or retired from motor activity as in the case of sleep paralysis, or blocked with stammering speech. It is interesting to note that his stammering and his sleep paralysis came on at about the same time. His stammer was expressed only when some of his conscious controls were removed, and when he spoke freely of his resentments against his officers.

DISCUSSION

The interesting phenomenon of sleep paralysis has never been analyzed, either physiologically or psychologically, in a completely satisfactory manner. Like other authors, Brain (1) points to the similarity of sleep paralysis and cataplexy, the first being of a more gradual onset. He states, "In sleep paralysis sleep does not normally spread rapidly and diffusely through the nervous system, but the motor and postural centers fall asleep before the mind, or in awakening the mind awakens before the body but in either case, the patient is conscious, but powerless; in somnambulism, the reverse occurs—the motor and postural centers are active while the mind is asleep." In a recent report on two cases, Rushton (6) refers to Pavlov's theory of internal inhibitions which assumes that normally the inhibitory process of sleep spreads progressively over the cerebral hemispheres, and that any disintegration of this process results in sleep paralysis. The most valuable contribution on the subject, however, has been made by Langworthy and Betz (5) in their discussion of the clinical syndrome of cataplexy. These

authors consider excessive diurnal sleep, cataplexy, sleep paralysis, somnambulism, nocturnal hallucinations and frightening dreams, singly or in combination, as neurotic defenses similar in many respects to hysterical reactions. Observation of six cases led them to the conclusion that the narcoleptic symptom is an attempt to avoid anxiety caused by strong, but frustrated, drives to break away from a long-standing life pattern to which the patients conform but which they deeply resent.

In none of our cases was narcolepsy, cataplexy or sleepwalking present; sleep paralysis was associated in only one of the six cases of narcolepsy described by Langworthy and Betz. In all of our cases, organic changes, as well as heredity of epilepsy, were absent. We were dealing with flying personnel and one ground crew member, all of whom went through severe combat experiences and who, for a long time, could never be sure of regular sleeping hours. The question could be raised as to whether these unusual circumstances could have led to the abnormal dissociation in the physiological process of sleep. However, the infrequency of sleep paralysis among Air Force personnel who have endured similar experiences, suggests a more specific etiology in our three patients.

Our case studies have of necessity been brief and superficial, and only a more thorough analysis could reveal the immediate, individual significance of the attacks. Nevertheless, we have found a common element in three patients. These men, suffering from an emotional disorder precipitated by combat, were intensely disturbed by confusion as to their emotional direction. None of them felt free to let himself go in one direction or another, which would have caused him to be predominantly depressed, hostile, dependent or demanding. None of them was guided by one primary goal, and, it was our impression that this was not only a matter of inhibition or lack of verbalization, but that the individual himself was deeply confused as to his intellectual and emotional motivations. Indecisiveness, indeed, was a definite characteristic of these patients without conforming, however, with the clinically well-known *folie de doute* or compulsive neurosis. This indecisiveness and lack of goal-directed behavior had been present in them before, but it evidently was considerably aggravated by the superimposed combat fatigue.

It is more than conceivable that the psychosexual organization of our patients—who manifested so obviously a conflict about their passive submissive sexual needs—formed a basis for their indecisiveness and resulting sleep paralysis. The symptom occurs only just prior to sleep, or on awakening, in other words, at times when sexual urges are active, and controlled to a much lesser degree by the conscious restrictive or suppressive part of the personality. In this respect, sleep paralysis differs from the hysterical conversion paralyses which do not develop so often in immediate relation to sleep. Also, those disturbances are usually localized and symbolically easy to understand. Sleep paralysis on the contrary, involves as a rule, the entire body, and as we saw, even phonation. We, therefore, would like to consider it as a phenomenon of a much more diffuse nature, one which, in all probability, is determined by pathophysiology affecting those centers essential for the regulation of sleep.

In two of our cases, partial reintegration of the personality led to the disappearance of sleep paralysis. Whether this will hold true for other cases may be learned from further study of combat fatigue of which paralysis is occasionally a symptom.

SUMMARY

Three cases of sleep paralysis in returned Air Force personnel suffering from combat fatigue, have been reported. The condition occurred singly, not in association with cataplexy, narcolepsy or somnambulism. Superficial analysis led to the impression that sleep paralysis is, in all probability, related to a state of confusion as to emotion and intention, with resulting indecisiveness. This symbolic interpretation of the symptom needs verification by more detailed individual analytic studies.

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POSTSCRIPT

Since the above article was prepared for publication, the junior writer has seen nine more cases of sleep paralysis associated with combat fatigue. With an almost unusual uniformity they all conformed to the basic dynamic patterns described in this paper.

CORRELATION BETWEEN EMOTIONS AND CARBOHYDRATE METABOLISM IN TWO CASES OF DIABETES MELLITUS

ALBRECHT MEYER, M.D., LUDOLF N. BOLLMEIER, M.D. AND FRANZ ALEXANDER, M.D.*

Carbohydrate metabolism is one of the most complicated mechanisms in metabolic physiology. Many questions are still unexplained, and many workers are interested in their final solution. In this paper we will report two cases of diabetes mellitus that were treated by psychoanalysis and at the same time were under the close clinical observation of Dr. Rollin T. Woodyatt who controlled the diet and the insulin therapy. Our clinical laboratory made frequent blood-sugar and quantitative urine analyses which enabled us to correlate the change in the carbohydrate metabolism of the patients with their emotional reactions.

We adopted the technique of daily urine analysis by making four to six quantitative urine examinations every day. This method of observation allowed us to correlate the psychoanalytical material with the fluctuation of the sugar output in diabetes mellitus cases.

In the two cases we will describe the patients were intelligent and cooperative, keeping to their diets strictly and carrying out the laborious collection of their urine in small specimens for almost two years, so that we feel that the results of the investigation are reliable.

CASE 1

The patient was a young man, 29 years of age, good looking, well-mannered and of high intelligence. He came of a healthy family in which no case of diabetes had been known. His mother died of a benign tumor operation when the patient was 20 years old. She was a very sensitive woman with a decisive sense of order and cleanliness, who apparently suffered much during her marriage to the patient's father, a strong husky man of rough manners and quarrelsome disposition. He frequently came home drunk, on which occasions the patient was exposed to violent scenes of marital discord. His sister, three years older than the patient, showed more resemblance to the father and dominated her younger brother who reacted with the same sensitiveness as his mother and avoided quarrels, suppressing his anger to the utmost.

There was a strong attachment between brother and sister which continued also after the sister's marriage. At the same time the patient felt a strong jealousy toward her on account of the greater affection the father showed to his daughter. As a compensation the patient developed a technique of winning people for himself by always being a good child, doing things for others in the most polite manner, carrying packages for older people for instance, and becoming the beloved and praised child of the community, in contrast to the sister who often was criticized or punished for her behavior. This attitude became a distinct character trend during his later life. Through his pleasant manners and charming personality he gained many friends, and he was one of the best-liked teachers in the high school where he taught. To be loved by everyone became a constant craving in him, and he controlled carefully, any manifestation of anger and resentment. The roots of this behavior pattern probably lay in his earliest life experiences. He was seriously ill between the ages of one and two years, starving under a strict diet for almost a whole year on account of a severe gastro-intestinal disturbance, very likely with insufficient medical care. He recovered and was in good health until his diabetes developed. However, a strong craving for all sorts of sweet food persisted from childhood to adulthood which consequently overburdened his carbohydrate metabolism. It seems likely that the anxiety a child experiences under the threat of starvation brings out strong inhibitions in later life against expressing natural emotions. It is highly significant that a very strong affectionate tie remained, in later life, between the patient and his mother's sister. This aunt took care of him during his childhood illness, always giving him the surplus affection he craved, while his mother, too preoccupied with her marital problems and her compulsive cleanliness, did not respond in the same way. It seems that his early traumatic experiences during his illness were not sufficiently compensated by his mother's expressions of love. The subsequent development of an insatiable craving for sweet food, a desire to be loved, praised and to receive presents may have been a compensation for his mother's love of which he felt deprived. He learned to hide all manifestations of his hostile impulses, since this was necessary in order to ingratiate himself with everyone in his environment. Whenever he was involved in a conflict he withdrew and sank into a mood of self-pity and depression. This rôle of being the charming beloved child was seriously disturbed by the onset of puberty. His first sexual ex-

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periences consisted in continuous homosexual play with other boys. During this period of two years' duration the patient was in a state of depression. His first heterosexual experience occurred at the age of eighteen, and was followed by others, frequently with older women. At the age of 24 the patient was engaged for two years to a woman who was ten years older than he. Apparently there was too much responsibility involved in this relationship; he dissolved the engagement and had numerous heterosexual experiences on a very playful level, alternating with homosexual experiences from time to time which were always connected with anxiety and self-reproach afterwards. He stated once that homosexuality was so easy, was always available among his friends, and involved no feeling of responsibility. All this gives us a good picture of the patient's inclination to retain an immature, childish, dependent attitude and his refusal to adopt the responsibilities of adult life. Homosexuality, however, was far from being a satisfactory solution to his problem and involved him in another serious conflict. In the fall of 1935 he was seriously confronted with an emotional problem which he could not solve by his previous method. His love object was a very unstable young man who forced the patient into a submissive position, let him do all the kitchen work, kept him always waiting and in constant suspense. In this relationship he did not occupy his usual, dependent rôle and had to cope with all the difficulties of a man having a spoiled, demanding mistress. He did not even have the narcissistic compensation of playing the leading position in this affair. For the first time in his life he did not succeed in keeping the relationship on a playful, casual level. He became very attached to this friend, waited for his letters impatiently and craved his love, but suffered at the same time because of the lack of affection the friend showed. He had to renounce all his receptive wishes and tried to disregard the resentment which developed simultaneously on account of this. He tried to break away from the friend by attaching himself to an older woman who already had adult children, and who overwhelmed him with attention and presents, tolerating at the same time all his erratic outbreaks of rage. But in spite of all the conflicts involved in the relationship with his friend his desire for him continued very strong until he broke down with diabetes.

The outbreak, or more precisely, the discovery of his diabetes took place under the following circumstances: At Christmas in 1935, the patient went home to his father and step-mother, and became ill with flu. He never actually recovered from extreme tiredness, and was in poor health during the whole winter. In the spring almost all his teeth showed cavities and a serious furunculosis developed. He lost about fifty pounds and in May, 1936 he was brought into a hospital almost in a state of coma. Here his diabetes was discovered and he remained under clinical observation for about three weeks. He was put on a diet and left the hospital under the régime of 150 gram carbohydrates, 75 gram fats, 75 gram protein, and 40 units of insulin daily. After he left the hospital he gave up all contact with his friend and continued the attachment with the older woman. In this relationship, which assumed a thoroughly sado-masochistic character, the patient received gratification from actually attacking her, and also from receiving attention and presents from her. No matter how gratifying this relationship might have been in satisfying both his demanding-receptive wishes and in providing an outlet for his aggression, it soon became intolerable for certain external reasons. The woman threatened his whole social existence in the small town, causing open scandals and forcing herself on him continuously. He then consulted the psychoanalyst.

Brief Description of Analysis

The first impressive material was the intensive conflict about his relationship to the older woman. After three months of treatment he gained the courage to give up this relationship which was a source of such suffering for him. However, this break deprived him of a certain equilibrium. The relationship had satisfied his strong receptive tendencies and had given him a target for his rage. Deprived of these vents he became restless. As a result he again became susceptible to the old homosexual solution to the same instinctual cravings. A letter from his former boy friend found him in this frame of mind. He wrote that he wanted to come back and live with him again. The temptation to find relief for his receptive wishes in a passive homosexual way was great, but so was the fear of the frustration which he had experienced during his affair with this man. This anxiety blocked the possibility of a homosexual solution. Dreams appeared in which hostility was expressed toward the homosexual partner. He refused to live with the friend and turned to a woman who had outspoken masculine trends and thus could serve as a substitute for a man. She presented a suitable object toward whom he could assume a passive-receptive attitude. He wanted to marry her but was rejected and the relationship terminated in April, 1938, *i.e.*, after psychoanalytic treatment of eight months. It was around this period that for the first time in his life he could express the angry tension which always lay beneath his pleasant surface.

Finally, the greatest progress toward normality in his sexual life occurred when he chose, in the summer of 1938, a healthy young girl and had a satisfactory relationship with her. There was no responsibility involved in this relationship and he could therefore tolerate it. His relationship with his father became a much freer one, and as a whole he spent a very happy summer.

When he returned from home, he fell in love with a young girl just graduated from school, who had high emotional and intellectual qualities. Through this love his main conflict between a dependent, demanding attitude and a more responsible mature relationship to a woman came to the surface, together with all the hostilities which he harbored toward mother-substitutes who thwarted him. In this phase of analysis it did not yet appear safe to advise marriage, but the patient felt that he was so much in love that he wanted to go through with his marital plans in spite of the restriction of his analyst. Finally the analyst consented. He had the impression that the girl was a good object choice, and a more stable life would be a definite advantage to the patient's physical and emotional health. The couple married at Christmas and the adjustment was a very good one. A short period of friction and violence developed when the analysis touched again the patient's aggressive oral biting tendencies toward his mother and sister. In fact, one night he physically attacked his wife. The most difficult part of the analysis was to bring out his deeply hidden murderous tendencies toward his mother. It was unavoidable that some acting-out should take place. All the hate toward his mother, accumulated probably during the sickness and starvation period in his infancy, came to his consciousness and could be worked out in analysis. This hostility appeared in dreams, mainly expressed in omnipotent biting fantasies, together with the deep anxiety of an utterly helpless child. After this early stormy period of the marriage, the patient gradually developed much greater freedom, greater interest in life and a good sexual adjustment. He finished his analysis in 1939 and is now, after an additional six years, well adjusted in his marital life, successful in his profession, and very much attached to his child which was born a year after he married. During the past five years, the patient's urine has been free of sugar and he is in good physical health.

Correlation Between Carbohydrate Metabolism and Emotional Tendencies

Figure 1 shows great changes in the amount of sugar eliminated during 24-hour periods, expressed in grams of sugar. The patient was actually sugar-free for 1½ years, including the first four months of analysis. At the end of December, 1937, he gave up the relationship with the older woman and was exposed, as described before, to his homosexual conflict. On January 22, 1938 he had a sudden surprising peak of the curve to 80 grams of sugar in 2000 c.c. of urine. Two days before this he had unexpectedly received a letter from his friend who announced his return to town. The patient did not open the letter at once, was very excited, and when he finally did read it, the urine specimen showed the high amount of sugar during the following twenty-four hours. The emotional conflict to which he was exposed was the anticipation of having to play the mother to this friend instead of indulging in a dependent relationship to him. He retreated from this homosexual temptation, led a very withdrawn life during the following weeks, and remained at home in a depressed self-pitying mood, a withdrawal which he had used very often even in childhood. (Note low sugar level during this withdrawal period.)

The highest peaks in the whole curve were on April 6th and 20th of 1938—almost 100 gram sugar output. They were related to rejection of his marital proposition by the homosexual girl, and were connected with a tremendous rage he did not dare to verbalize or transfer into motor activity. This rage was a reaction to being thwarted. The masculine girl who was wealthy did not want to play the mother to him, rejected him as a husband and decided to continue in a homosexual relationship. The low point on March 12, 1938 is again connected with neurotic symptom formation and withdrawal after an indulgence in his homosexuality two days before. The lowest part of the curve, with almost no sugar, was during June, 1938, when he had his first satisfactory heterosexual relationship which did not involve responsibility. The conflict turned up again at the end of August when his attachment to his fiancee brought up deeper conflicts between his receiving wishes and a more mature sexual attitude.

Most instructive are those detailed examinations, which show the fluctuations of the carbohydrate metabolism during one and the same day. The examination of the sugar output on August 25, 1938 brought the most revealing insight into the structure of the patient's conflict and allowed us to draw more definite conclusions in regard to the conflict and its effect on the sugar output. He voided his urine during that day in five portions, the total volume of which was 2715 c.c. In the analytical material of the day before, the receptive and demanding tendencies of the patient were very strongly expressed. He had a dream in which there appeared an older woman who had a res-

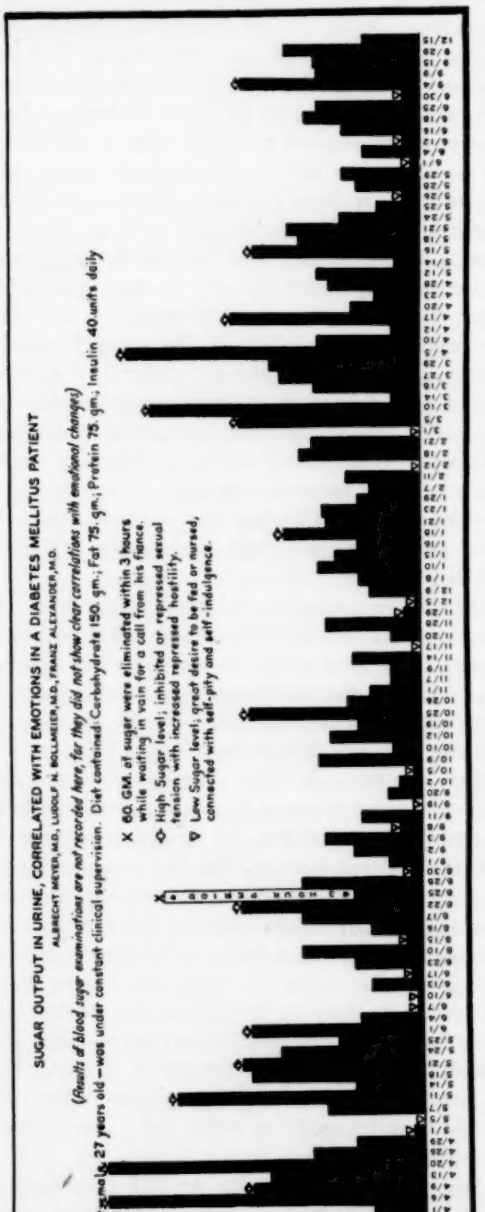
SUGAR OUTPUT IN URINE, CORRELATED WITH EMOTIONS IN A DIABETES MELLITUS PATIENT
ALBRECHT MEYER, M.D., LUDOLF N. BOLLMEIER, M.D., FRANZ ALEXANDER, M.D.
(Results of blood sugar examinations are not recorded here, for they did not show clear correlations with emotional changes)
Patient male, 27 years old—was under constant clinical supervision. Diet contained: Carbohydrate 150 gm.; Fat 75 gm.; Protein 75 gm.; Insulin 40 units daily
X 60 GM. of sugar were eliminated within 3 hours while waiting in vain for a call from his fiance.
◇ High Sugar level; inhibited or repressed sexual tension with increased repressed hostility.
▽ Low Sugar level; great desire to be fed or nursed, connected with self-pity and self-indulgence.
3 HOUR PERIOD
Grams of Sugar

FIGURE 1

taurant and supported younger boys. In the dream he inquired where this woman lived. Anxiety came up together with the thoughts of marriage. The first specimen was negative. The second showed four grams of sugar. Increased anger developed toward his fiancee during the afternoon with the conflict about marriage and responsibility in the foreground. The anger was especially provoked through the wish of his fiancée to give up her position on account of the intended marriage. This anger can be characterized as a childish, aggressive, demanding claim to be given what he wanted. The specimen from 6:30 to 11 p. m. showed *61 grams* of sugar. He spent this time alone in an angry tension, expecting from her a telephone call which did not come. Here we see very clearly the frustration of his wish to be taken care of by the girl he loved, as the child by the mother. At the same time he was in a sexual tension, wanting to marry the girl; but this would involve adult responsibilities in contrast to his regressive infantile tendencies. On August 29, 1938 he had almost no sugar in the morning but had a sugar output of 14 grams in 340 c.c. later in the day when a friend came, as a very unwelcome guest, to visit him. He was forced to make lunch and the friend ate a great deal in an uncouth manner. He was in a state of rage and was not able to express his tension at all. Again we see his original conflict coming out, being forced to be the feeding mother instead of the receiving child. On March 6, 1939 the sugar output was 2 grams during the night and 7 grams in the morning. During the night a violent physical attack upon his wife occurred, connected with rage because his wife had given up her job. After this fight they became reconciled and had sexual relations. The corresponding sugar output was minimal. The next afternoon, however, he and his wife went to see the friends who had been present when the attack took place. The patient had to control himself, play a responsible rôle, and repress his demanding attitude. The sugar output went up to 33 grams in a couple of hours.

Following the diagram during the next months, we see that as a whole the sugar output during the time he spent at his work was greater than the sugar output during the night or at other times outside his work situation. The same tension as described above developed when he had to earn money for his wife and provide instead of receive. For instance, on a day of physical and mental rest there was no sugar eliminated, but during the working hours of the following Monday the sugar output was again 18 grams. On April 21, 1939, six grams of sugar were eliminated during a Sunday spent on vacation in contrast to 21

grams of sugar eliminated on Monday morning during a few hours in school.

There were, however, Sundays and Saturdays with a high sugar output in all urine specimens. For example, on the 10th of March 1939, the sugar output was almost 80 grams. On this day his psychoanalytical material showed the usual conflict about his biting and incorporating tendencies. This also became manifest in the behavior toward his wife, who at this time began to demand a great deal of attention, and expressed jealousy of his former friends, who spoiled the patient with attention and presents. It is thus evident that the presence of emotional tension is responsible for the fluctuation of carbohydrate metabolism. Physical relaxation on Saturdays and Sundays have a beneficial effect only if they are combined with an even emotional state. In the summer of 1939, when, as a result of his analysis, he was able to accept a more responsible adult attitude without internal revolt and live in good marital adjustment, the sugar output decreased substantially.

One year after the termination of his analysis, a son was born, and his fundamental conflict about his receptive dependent wishes came up again. Correspondingly there is a rise of the sugar level to a high peak. During the last years the patient remained sugar free and has continued so to date.

In Summary

The patient, who suffered a severe trauma at the end of his nursing period, retained much of his infantile dependent and demanding attitude and was never able to accept the responsibilities of adult existence. He always felt frustrated and responded with hostilities because no one could gratify his demands for attention and love. These hostilities revived his old anxiety that he might lose love and security as an equivalent of milk and food of which he was deprived during the starvation period of his illness. The process of emotional maturity was blocked by this anxiety. He never reached the psychosexual attitude of adult age. His diabetes developed at the height of his emotional frustration which arose in relation to his sexual partners. Whenever they demanded of him any affection which was incompatible with his own infantile demands, he felt utterly frustrated and enraged.

In the diagram we recognise that the sugar output increased when the patient felt that his wishes to receive love and security in the manner of a child, were frustrated. Low sugar levels occurred when he escaped the conflict by turning to his neurotic solution of the depression, a withdrawal from the outside world into self-pity.

CASE 2

The second patient, a woman of 26, had a psychopathic personality with many depressive trends and a tremendous drive for acting out dramatically her emotional conflicts. The roots of her illness went back to her infancy and manifested themselves in temper tantrums and outbursts toward her mother and younger siblings. She accused the mother, in her analysis, of not feeding the children carefully and sufficiently and complained that she herself never received enough milk. As far back as she remembered, the siblings took the best food away. Probably for this reason she developed an early interest in food. As an overcompensation she shared with the mother the rôle of feeding the younger siblings, provoking the mother at the same time through her rages. This behavior became the dominating trend of the patient's later life. Prematurely, in early puberty, she left home to take care of other people's children. In spite of good intelligence she did not finish school but worked either to prepare or serve food, or to take care of children. In this manner she lived in a constant state of frustration. She was feeding others, but no one took care of her. In this she differs from the first patient who indulged more freely in his receptive wishes. The second patient always denied herself the satisfaction of her receptive cravings. For this reason her hostilities toward her environment became very strong. This caused great anxiety and blocked her way to a psychosexual maturity to a much greater extent than in the first case. Her sexual drive appeared comparatively early and was expressed rather frankly if we consider her puritanical background. In early adolescence she had sexual experiences with older men and became very promiscuous later on. However, she remained frigid and unresponsive unless she was under the influence of liquor. It is needless to say that under these conditions her attitude did not even remotely resemble a mature reaction to her environment.

The outbreak of diabetes occurred exactly as in the first case, coinciding with exposure to sexual temptation. The patient wanted the love of an elderly man for whom she worked. To win the love of this man, who was her superior in a restaurant kitchen, she worked extremely hard and deprived herself still more of the satisfaction of the passive desires of her private life by sacrificing rest and relaxation. Her strong cravings remained unsatisfied until she became extremely restless. During this time she had a minor accident, spraining her ankle in a fall, and also had her first diabetic symptoms which were extremely severe. She was taken to a hospital almost in a coma. For three years she lived under a diabetic régime similar

to that of the first patient, and came to analysis because her emotional problems increased simultaneously with the diabetic condition.

The most revealing part of the analysis was the transference situation of patient to analyst. Very early she developed a strong transference with expressions of her sexual desires in a most frank and demanding way, especially when the analysis, because of external reasons, had to be interrupted temporarily. These were emotionally of a pregenital nature which she expressed in an utterly demanding attitude toward the analyst, asking for interpretations, explanations, and immediate help in the most urgent way, just as a hungry and spoiled child demands milk and food from the mother. There were repeated periods in which the patient was under a tremendous rage which was usually connected with an extreme tension felt in her whole body. There were also frequent outbreaks of rage against the analyst toward the end of the session, especially when the analyst expected cooperation and understanding of the material from her. The patient was unable to cooperate as an adult, and being exposed to the demands for cooperation in analysis, her infantile dependent wishes increased together with frustration and resentment.

The analytic material shows clearly the sadistic coloring of her sexual fantasies and reveals that anxiety blocked gratifications and thus increased her dependent wishes.

Correlation Between Carbohydrate Metabolism and Emotional Tendencies

In Figure 2 we see that the patient had a comparatively equal elimination of sugar during the first few months in analysis. During this period there was a rather balanced emotional state. This balance was disturbed as soon as the patient became involved in an emotional conflict situation toward the analyst, transferring to him all her emotional childish demands and feeling rejected when these were not satisfied. We see that now the sugar output began to fluctuate. Shortly after the patient returned to analysis, after an interruption of almost six weeks, the output was only 3 grams. This was on February 29, 1940. A change of analyst had taken place and the new analyst took a lenient attitude toward the disturbed and excited patient, which satisfied the strong dependent tendencies of her personality. The curve, however, soon went up again, reaching its previous level coincident with the expression of infantile demanding sexual desires toward the new analyst. These were expressed in the same manner as toward the first analyst. On March 17th there was a low sugar level of 29 grams with corresponding analytical material of emotional withdrawal and aloofness. From May, 1940 on, there was a constant fluctuation in the sugar output which remained throughout the analysis.

An interesting observation is that of the fluctuation

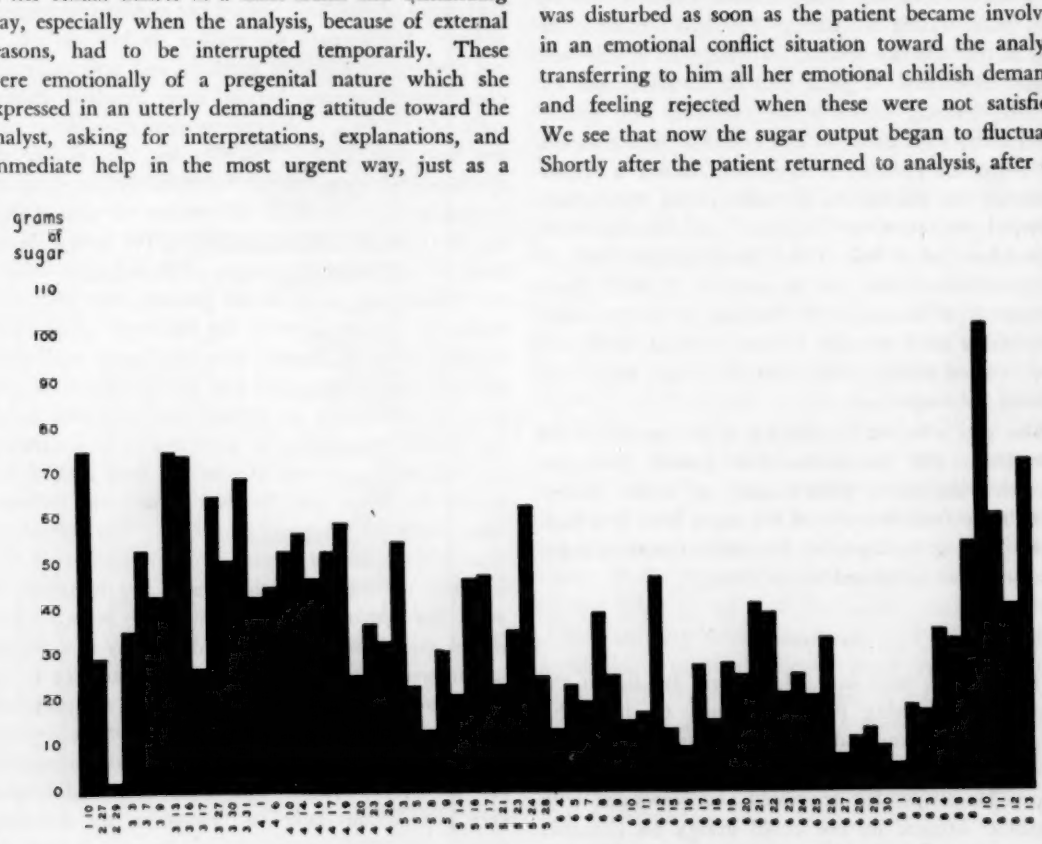

FIGURE 2. Sugar output in urine, correlated with emotions in a diabetes mellitus patient.

in the sugar output during the night, a time when there was no intake of food or insulin administration. Since dreams are an expression of emotional life during sleep, we tried to compare the emotional content of the dreams in the nights of the highest sugar level with dreams of nights when the sugar output was low. In five nights 65 grams of sugar were eliminated out of a total of 190 grams sugar ingested. This means that one third of the sugar output occurred during the night. The dream contents during these five nights indicated a high sexual tension together with hostile feelings toward competitors. In five nights in which the sugar output was very low we had a total of 4.4 grams while the sugar output of those five nights and days together was 86 grams. The dreams during these five nights of low sugar content expressed regression to passivity and playfulness, and the absence of sexual wishes.

A similar very revealing observation can be made when the patient reacted to the vacation the analyst took during the summer. She became very excited, restless and sexually stimulated, dwelt in sexual fantasies and masturbated frequently. During this period we have a constant rise of sugar level to a peak of 110 grams on August 10, 1940. The patient's behavior showed so many manic manifestations that the analyst had to decrease the hours. Later on he changed the treatment from analysis to psychotherapeutic interviews. The sugar level decreased considerably after this, coinciding with manifestations of depression, passivity and withdrawal. It should be emphasized that the patient's psychosexual drives were completely of an infantile demanding nature, expressing the wish to be taken care of completely by the sexual object.

In Summary

The patient developed during early infancy strong reactions of hostility and envy toward the mother and younger siblings, together with a tremendous interest in and craving for food. In contrast to the first patient she did not allow herself even substitute gratifications of her dependent wishes in later life on account of her strong hostilities and subsequent anxiety and guilt. Her dependent needs grew so strong that no life situation could satisfy them even to a small extent, and because of this the patient lived in a state of constant frustration and embittered anger. Her sexuality centered in the erotization of these intense demanding infantile tendencies. When the patient withdrew and indulged in self-contained passivity and aloofness, the sugar level became proportionately lower.

SUMMARY

A report was given on two cases of diabetes mellitus —in a man and a woman—who both developed their illness under the strain of an emotional conflict of striking similarity. Both subjects showed unusually strong tendencies to receive and to be taken care of. The first patient's essential demands were stimulated by a physical trauma at the end of his weaning period; the second patient's by a traumatic weaning process. Both patients retained an infantile dependent and demanding attitude, and felt frustrated because their demands for attention and love were out of proportion to the reality situation of an adult and consequently were never adequately satisfied. To this frustration both patients reacted with hostility. Diabetes developed in both cases when these infantile wishes conflicted with the demands that were frustrated, and the sugar output decreased when they temporarily renounced their demanding attitudes.

In the diagram we see very clearly that sugar output is increased under the strain of the above conflict, and decreased when the patients indulged in self-pity and passivity.

It seems probable to us that these food-demanding drives, under the condition that nobody is there to satisfy them externally, may turn to an autoplastic satisfaction in a metabolic process which mobilizes glucose out of the glycogen stores of the body.

The observation of the increased sugar output during the night, *i. e.*, independent of the carbohydrate intake, under certain emotional conditions described above, is consistent with these assumptions. This interpretation is in conformity with recent experimental findings, namely, that in certain cases of diabetes mellitus the rise of the sugar level is dependent not on failure of sugar utilization but on sugar mobilization.

EFFECTS ON INDUSTRIAL PRODUCTION OF THE ADMINISTRATION OF Δ5 PREGNENOLONE TO FACTORY WORKERS, I

GREGORY PINCUS AND HUDSON HOAGLAND *

Worcester Foundation for Experimental Biology

In a previous paper we (2) reported that the steroid substance Δ5 pregnenolone, when administered orally, appears to be active both in enhancing psychomotor skill in manipulating pursuit meters, and in retarding the decline in time in pursuit meter scoring ability, thus serving to postpone measurable fatigue symptoms. This substance is believed to be an important intermediate metabolite in the formation of steroid hormones. (For a consideration of its pharmacology see (2).) We were led to its use initially by our observations that stress of work of a variety of kinds enhances the excretion of 17-ketosteroids primarily of adrenal cortical origin (1).

In this paper we shall describe studies of two quite dissimilar industrial operations in relation to periods when the workers were taking pregnenolone and when they were taking placebos. In one plant we found no evidence of pregnenolone facilitation of production, while in another we found pregnenolone to enhance both the quality and quantity of production over the placebo level. Possible reasons for the different results in the two plants are discussed.

I

Procedure: The first operation studied was the efficiency of cutting leather for shoe innersoles at the Farber Leather Company of Worcester. The soles were cut from the bellies of tanned hides by skilled cutters working 7½ hours per day. The work involves the manual operation of a cutting machine and a set of dies of various standard sizes. The sole leather is distributed to the operators in carload lots. Each man receives a certain weight of hides and proceeds to cut five standard sizes in pairs. The men are instructed to attempt to obtain specific sizes in definite proportions as follows: 2, 7's: 3, 8's: 4, 9's: 2, 10's: 1, 11. It is expected that each operator will approximate a set daily quota of sole pairs. When the operator has cut all the above standard sizes that he can from a given piece of leather he then proceeds to cut pairs of small soles (for children's and misses' sizes, 2 to 9). The men's soles, the small soles, and the scrap remaining are each weighed separately. Since the men were paid fixed weekly salaries, they were not on piece work and production was limited by quota, the only measures of work performance we could use were the percentages of waste produced; it being assumed that the men producing the smallest percentages of waste leather are the most efficient cutters.

In this experiment eight skilled, seasoned male operators were selected as subjects. They operated on widely separated machines. The men were divided into two groups of four each. Throughout the course of the experiment each group worked successively on its special carload lot of leather. The men were informed that they were being given "vitamin-like" pills that might control colds and improve their general well-being. Two men in each of the two groups received lactose placebos, the other two in each group received pregnenolone (45 mgm.) in lactose. The tablets were identical in taste, size and appearance. They were distributed at 11 A. M. daily by an office worker who gave an extra tablet for self-administration on Sunday. The men did not know that their production records were being observed in relation to the experiment.

During the experimental period lasting eight weeks, four carload lots were cut. At the conclusion of the cutting of one carload the medication was switched so that those who had been receiving pregnenolone were then given placebos and vice-versa.

Results:

1. For the ten carloads preceding the experiment the four men who were given placebos (Group A) initially produced 26.99% of scrap, the four men given pregnenolone initially (Group B) averaged 26.84% scrap. These means are not significantly different.

2. During placebo administration Group A produced 29.20% scrap, and during pregnenolone administration 29.44%, thus showing no significant change during tablet administration. Group B, during placebo administration, produced 29.37% scrap, and during pregnenolone administration 26.92% scrap, an improvement which is not statistically significant.

3. Pregnenolone administration therefore does not lead to the elimination of waste in leather sole cutting under the conditions we have described. It should be noted that no incentive for improved performance was offered in this plant, and that various factors other than work skill affect scrap production. The scrap

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figures may, for example, be masked by cutting two poor soles where one good one is called for—a factor checked upon irregularly by the foreman. The work was not regarded by the operators as especially stressful under the limited production schedule.

II

Procedure: Our second study was made on a group of twelve turret lathe operators (eight men and four women) making bayonets for army rifles on a rush order at the Parker Manufacturing Company of Worcester. The pay was entirely on a piece work basis and for this reason, coupled with the general high level of plant morale, the production incentive was high. The operators worked in 7½ hour shifts and there were three shifts per day of four operators each thus keeping in constant operation the four multiple turret lathes set up near each other in the same room.

The workers were assembled and agreed to cooperate in taking a "new vitamin type pill" that might lessen their susceptibility to colds. The tablets were distributed daily by the plant nurse, but on Saturday each worker was given an extra tablet to take at home on Sunday. In cases of absence from work, the nurse went to the worker's home to give him his daily tablet.

Two sets of tablet triturates were made up, a placebo made of lactose and a pregnenolone tablet containing 45 mgm. of pregnenolone with lactose. In taste and appearance the tablets were identical. They were put in individual amber bottles for each worker and labelled with his or her name and whether a bottle contained pregnenolone or placebo tablets was known to no one at the plant. The workers believed that they were getting a uniform medication throughout the experiment and were unaware that their production figures were under special scrutiny.

Two operators on each shift were given placebos and two on each shift were given pregnenolone pills. Thus half of the 12 workers were on placebos and half on pregnenolone at any given time. At the end of four weeks this régime was reversed, *i.e.*, the workers who had been on placebos were then put on pregnenolone and those on pregnenolone were put on placebos. At the end of five more weeks there was another shift of medication and four weeks later all medication was stopped. During the first months of the experiment one man left the factory and was replaced by another experienced turret lathe operator. During the last six weeks of the experiment three men left the factory but data on their replacements are not included in the study although for psychological reasons the replacements did receive placebos during the two weeks of tablet administration.

Measurements of production efficiency were made on the basis of the number of bayonets produced per 7½ hour day. The figures in our tables represent the average daily production. The group averages are determined by averaging the individual means calculated on a weekly basis. This was done so that the temporary absence of any single worker would not cause an underweighting of his performance. Production is given as per cent of a bogie. Data for a control period of four weeks preceding the tablet administration are included.

TABLE I

THE MEAN DAILY BAYONET PRODUCTION IN THE TWO GROUPS OF WORKERS

Grp. No.	No. oper.	Medication	Month	Wk. No. 1	Wk. No. 2	Wk. No. 3	Wk. No. 4	Wk. No. 5
1	6	None	Feb.	121.0	124.5	128.5	134.7	....
2	6	None	Feb.	128.7	128.5	131.0	134.4	....
1	6	Placebo	Mar.	132.2	150.3	154.9	150.1	....
2	6	Pregnen.	Mar.	139.8	152.1	155.7	149.1	....
1	6	Pregnen.	Apr.	147.2	153.1	157.9	159.5	158.1
2	6	Placebo	Apr.	144.5	157.0	148.3	150.1	151.7
1	6	Placebo	May	163.8	143.2	131.4	137.7	....
2	4	Pregnen.	May	151.8	165.8	158.6	159.2	....
1	5	None	June	143.4	143.5	150.1	146.7	....
2	4	None	June	144.3	148.8	155.5	145.4	....

Results: Table I shows the mean daily bayonet production in the two groups of workers and Figure 1 is a plot of these data indicating the relation of medication to production over a 21-week period.

Our data indicate that pregnenolone enhances production over and above the placebo level. After medication starts, production of the pregnenolone group increases during the first weeks as may be seen from figure 1. Since the workers were in the same room and were aware of each others' working pace, it is interesting that the group on placebos, after a week's lag, also increased its output, and very nearly reached

that of the pregnenolone group in the first medication period of four weeks. However, following the first shift of medication the former placebo group, then on pregnenolone, considerably outstripped the former pregnenolone group, then on placebos, and this crossing over of the two curves is still more dramatic following the second shift of medication (at the 3d arrow from the left). At the termination of all medication, the two groups produced bayonets at approximately the same rate but at a pace considerably above their original one. The greater speed acquired by the workers is only partly lost at the end of the series as may be seen from figs. 1 and 2.

If we define worker efficiency as the following ratio.

$$\frac{\text{Mean production per medication period per worker}}{\text{Mean production in (February) control period per worker}} \times 100$$

we may express the increase in efficiency over the initial February control period for both the placebo and pregnenolone effects as is done in Table II.

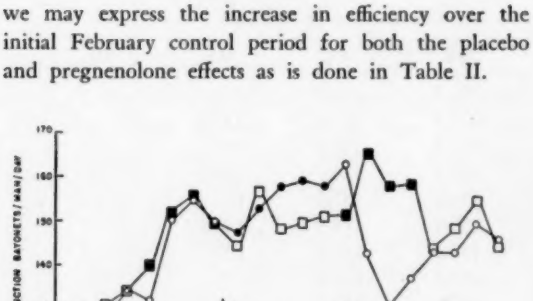

FIG. 1. Weekly bayonet production plot of the data of Table I; Group 1, circles; Group 2, squares. Shading indicates the group that was taking pregnenolone pills in contrast to the group taking placebos or no medication. The first arrow indicates the start of medication; the second and third arrows indicate shifts of the groups from placebos to pregnenolone pills or vice versa. The fourth arrow marks the cessation of all tablet administration.

From Table II it is clear that the increase of 8.2% in production when on pregnenolone as contrasted to placebos is statistically significant. The large coefficient of variation during placebo administration indicates a greater scatter of production compared to the steadiness shown by the same workers when taking pregnenolone.

Table III shows the scrapped or spoiled units produced by the two groups of workers over the five-months period of February through June inclusive. Here the smaller the figure the better the quality of workmanship. The scrap is expressed as per cent of production.

Table IV shows the per cent decrease in scrap production expressed as:

$$\frac{\text{Mean \% scrap per medication period per week}}{\text{Mean \% scrap in control period (Feb.) per week}} \times 100$$

Here the difference in scrap wastage favors pregnenolone as against placebos by 32.7% but the P

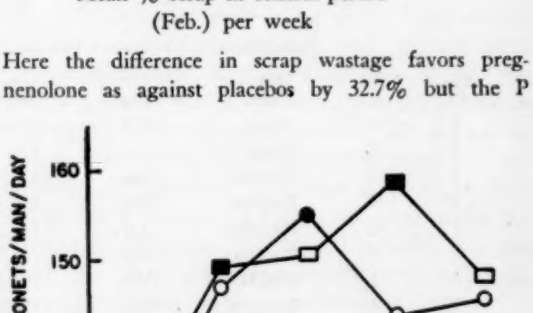

FIG. 2. The same data as in fig. 1 expressed on a monthly basis.

TABLE II

NET CHANGE IN EFFICIENCY

Medication	Mean increase in efficiency, %	Coefficient of variation, %	Standard error, %	Difference due to pregnen., %	P
Placebos	10.1	91.5	± 2.18	+ 8.2	0.005
Pregnen.	18.3	37.4	± 1.71	...	....

TABLE III

SCRAP AS PER CENT OF PRODUCTION IN THE TWO GROUPS OF WORKERS OVER A FIVE MONTHS PERIOD

Grp. No.	February	March	April	May	June
1	0.69 control	0.67 plac.	0.61 preg.	0.85 plac.	1.04 control
2	1.70 control	0.99 preg.	0.89 plac.	0.48 preg.	0.78 control

TABLE IV

PER CENT DECREASE IN SCRAP PRODUCTION

Medication	Net change scrap, %	Coeff. of variation, %	Standard error, %	Difference due to pregnenolone, %	P
Placebos	90.9	39.4	± 21.0	32.7	> 0.06
Pregnen.	58.2	51.5	± 17.3	...	...

value of > 0.06 indicates that this difference is not quite statistically significant.

No statistically significant differences have been found between performances of men as compared to women either in the control, placebo, or pregnenolone series.

DISCUSSION

During placebo administration our turret lathe operators showed an increased production efficiency over their previous control level of 10.1% ± 2.18%. During pregnenolone administration the increase was 18.3% ± 1.71%. The difference of 8.2% is $2.96 \times \delta_D$ and the P value is 0.005. These striking results are in sharp contrast to the lack of effect of pregnenolone with the leather cutters.

From our work with pregnenolone on pursuit meter scoring ability (2) we have been impressed with the fact that motivation of the operator plays a highly important rôle in determining improvement with medication. Our study of a group of seven army pilots making runs on a pursuit meter involving airplane type controls showed improvements ranging from 10 to 30% for different methods of scoring in hour tests when the men were on 45 mgm. per day of prenenolone in contrast to the period when they were taking placebos. In a similar series of tests on seven civilian student subjects significant score improvements were registered on pregnenolone in comparison with placebos, but the amount of improvement was much less, ranging from 2 to 10% for different methods of scoring.

The army pilots were highly motivated and performed in a competitive spirit. They believed that the findings would be important to the Air Corps and sought to make the highest possible scores at all times. The student subjects, on the other hand, were in their last semester of college in 1943 and expected to be drafted into the army at any time. Boredom and indifference to pushing themselves was characteristic of the student group in contrast to the aviators.

In a subsequent study by one of us, (HH) of a group of mental patients and hired normal controls in a busy hospital no significant difference in scoring ability was seen between groups when taking pregnenolone in contrast to placebos. In this last series, motivation to make high scores was in general at a very low ebb. Graham-Bryce, Bullen and Forbes at the Harvard Fatigue Laboratory have also reported negative findings with pregnenolone in a study of six indifferent operators using the same type of pursuit meter as that used by us (personal communication).

Thus if pregnenolone is to be effective in improving sustained psychomotor performance the operator must evidently be genuinely stressed by his work, so as to call upon emergency adrenal cortical mechanisms (1). In the industrial studies reported in this paper, the turret lathe operators were clearly working with a higher incentive than were the leather cutters and we believe that this may be important in accounting for the differences in results with the two groups. On the other hand, we must also bear in mind that better methods of scoring of work were available with the lathe operators in contrast to the methods available with the leather cutters.

In a following paper we shall report further findings indicating enhancement of production by pregnenolone in a variety of piece work operations in a plant making optical goods.

Finally we should like to point out that we have encountered no deleterious results in connection with the ingestion of Δ5 pregnenolone in our studies involving several hundred men and women who have taken the medication; in some instances in doses of 100 mgm. per day for as long as four months. The substance is nontoxic. For the most part, persons report no subjective experiences after its ingestion, although a considerable number have insisted that they experience a general feeling of well being and that they tire less easily when taking it.

SUMMARY

1. A study of eight skilled leather cutters was made over a period of eight weeks. The men received no incentive pay and the amount of production *per se* was therefore not a measure of the effects of experimental procedures. The wastage of leather was measured and compared when the men were taking 45 mgm. per day of Δ5 pregnenolone and when they were taking placebos indistinguishable from the pregnenolone pills. Pregnenolone administration was not found to lessen the wastage in cutting sole leather.

2. Twelve turret lathe operators (8 men and 4 women) were studied in relation to their daily pro-

duction of bayonets on a piece work incentive basis when taking pregnenolone and when they were taking placebos.

3. During placebo administration the efficiency of production increased 10.1% ± 2.18%. During pregnenolone administration the increase was 18.3% ± 1.71%. The difference of 8.2% is three times the standard deviation and the value of P is 0.005. The difference is therefore statistically significant.

4. Scrapped bayonets were less by 32.7% when the workers were taking pregnenolone in contrast to when they were taking placebos, but this difference between scrap figures is not quite statistically significant (P=0.06).

5. As medication was switched (Fig. 1) the production declined in the placebo group, rose in the pregnenolone group. This switchover effect occurred for each of two medication switches made during the series of tests.

6. On discontinuation of all medication an efficiency increase of about 10% remained during the four weeks the production was followed.

7. The rôle of job stress and incentive is discussed in relation to the findings.

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EFFECTS ON INDUSTRIAL PRODUCTION OF THE ADMINISTRATION OF Δ5 PREGNENOLONE TO FACTORY WORKERS, II

GREGORY PINCUS, HUDSON HOAGLAND,* CARL H. WILSON AND NELSON J. FAY†

In previous papers Pincus and Hoagland (1, 2, 3) have presented evidence indicating that the nontoxic steroid Δ5 pregnenolone enhances and prolongs the efficient performance of skilled psychomotor behavior, provided that the tasks are truly stressful and that motivation is high.

In this paper we shall examine the industrial production of 173 skilled operators manufacturing optical goods at the American Optical Company when they were taking pregnenolone and when they were taking placebos similar in appearance and taste to the pregnenolone triturate pills, but lacking in any active principles.

I

Procedure: Our experiments were divided into two series which we shall discuss separately. In the first series five plant departments comprising 77 male and female workers were studied. The work of four of the groups consisted of precise operations on spectacle frames—frame truing (bench work), and three different processes of frame soldering. In one department the work consisted of the manufacture by stamping machines of metal spectacle cases. All the workers were paid entirely on a piece work basis. Two of the departments (electric solderers) DH-1 and DH-2, were composed of nine operators each, one (punch press operators) DC-3, had sixteen operators, one, DO-1 (frame truers) had twenty-four operators and one (electric solderers) DO-2, had nineteen operators. Scrap in the form of wasted pieces requiring repairs was measured in two departments, DO-1 and DO-2.

Half the workers in each department were given pregnenolone, 50 mgm. per day in a tablet triturate with lactose binder and the other half were given lactose placebos except in Department DO-2. In this department six workers were given pregnenolone, nine were given placebos, and four received no medication.

At the end of four weeks medication was shifted in all departments excepting DO-2 so that those who had been on pregnenolone received placebos and those who had been on placebos received pregnenolone. In DO-2 the six on pregnenolone then took placebos, the nine who had been on placebos continued to take them and the remaining four continued with no medication. At the end of the second four week period all medication ceased in Department DO-2 but the production figures of this department were followed along with those of the other departments. In all of these other departments medication switch-overs of the sort described above continued for two more four-week periods, thus giving three switchovers in the sixteen weeks of the experiment.

As in previous production studies (3) the workers believed that they were getting a single medication of a vitamin type substance throughout the series. They were not aware that their production figures were under special scrutiny while they were taking the pills. The tablets were put up in individual envelopes with the worker's name and given to the worker each day by his supervisor who did not know the nature of the experiment or that some of the pills were blanks.

Results: Table I shows the mean production efficiency of the various groups during the experiment. The earnings of each worker in terms of the mean hourly wage for the ten weeks preceding the experiment were set at 100. Increased earnings therefore give a figure greater than 100; decreased earnings a figure less than 100.

Figures 1 and 2 graphically indicate the effect of pregnenolone and placebos on production, and Table II indicates the statistical significance of the differences. The increase in earnings of 1.32% above the placebo level is significant since with a t value of 2.17 the value of $P=0.013$.

The data show an overall increase in production on pregnenolone above pre-experimental levels of 4.2% which is 1.3% higher than the level on placebos. In department DO-2 with 13 out of 19 workers production fell below the pre-experimental level for the last two of the 4 months of the experiment. This drop however, cannot be attributed to the effects of the pregnenolone since none of these workers showing the decline took it during the experiment. These people, (two groups of 9 and 4 workers) served as controls, taking, as indicated, either placebos or no medication.

In figure 2 the net gain in increased production over the pre-experimental 10 week period is 4.2% for

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† Worcester Foundation for Experimental Biology and the American Optical Company.

TABLE I

MEAN PRODUCTION EFFICIENCY

(Means of 4 weeks per operator)

Department	Grp. No.	No. of workers	Medication	Period 1	Medication	Period 2	Medication	Period 3	Medication	Period 4
DH-1	1	4	Placebo	105.2	Pregn.	106.4	Placebo	105.4	Pregnen.	106.3
	2	5	Pregn.	105.2	Placebo	102.5	Pregn.	107.2	Placebo	105.0
DH-2	1	5	Placebo	100.9	Pregn.	102.8	Placebo	105.4	Pregn.	107.8
	2	4	Pregn.	104.0	Placebo	102.4	Pregn.	102.6	Placebo	97.9
D3C	1	8	Placebo	101.5	Pregn.	102.5	Placebo	101.1	Pregn.	101.8
	2	8	Pregn.	101.9	Placebo	104.1	Pregn.	106.1	Placebo	104.0
DO-1	1	12	Placebo	100.2	Pregn.	103.7	Placebo	104.2	Pregn.	106.3
	2	12	Pregn.	101.7	Placebo	102.3	Pregn.	103.6	Placebo	103.7
DO-2	1	9	Placebo	105.0	Placebo	100.7	None	97.2	None	97.1
	2	6	Pregn.	106.1	Placebo	104.2	None	101.3	None	104.9
	3	4	None	103.8	None	100.7	None	90.4	None	88.9
All Dept. except DO-2	1	29	Placebo	101.37	Pregn.	103.59	Placebo	103.72	Pregn.	105.32
	2	29	Pregn.	102.68	Placebo	102.84	Pregn.	104.77	Placebo	103.21

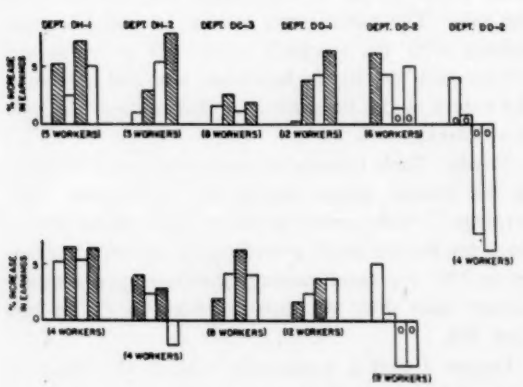

FIG. 1. Fluctuations of earnings with medication. Each rectangular column of the figure corresponds to a period of 4 weeks of work. Cross hatched columns represent workers taking pregnenolone; open columns placebos. A zero in a column means that no pills were given during that period. Each department was divided in approximately two equal groups which are represented one above the other. In Department DO-2 the workers were divided into three groups as indicated on the figure. Base line is mean production for 10 week period preceding experiment.

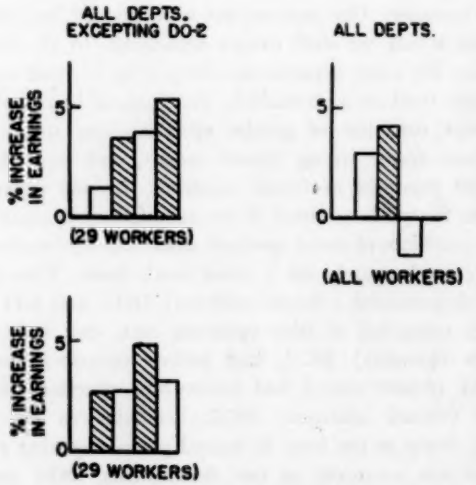

FIG. 2. Summary of data from Table I. For description of columns see legend to fig. 1. It should be noted that while each column of the two figures on the left corresponds to a four week work period as in fig. 1, the three rectangles on the right give the mean level of production on placebos, on pregnenolone and on no medication for the entire series without reference to time.

TABLE II

MEAN GAINS IN PRODUCTION EFFICIENCY FOR ALL DEPARTMENTS

Medication	Total No. of 4-week periods	Mean gain over premedication level	Difference (pregnen. minus placebo)	Standard error of difference	t
Placebo	116	2.90 ± 0.440	1.32	0.609	2.17
Pregnen.	116	4.22 ± 0.421	...	....	...

those on pregnenolone. If, however, the downward trend for the workers in Dept. DO-2 of 1.6% is seasonal and would have taken place in all departments had they been on no medication at all, we should be justified in regarding the total medication improvement as equivalent to 5.8% (*i.e.*, 4.2±1.6).

Table III and figure 3 show the effect of pregnenolone on the prevention of wastage in Departments DO-1 and DO-2.

The mean decrease in wastage in Department DO-1 was 18.9% when the workers were taking pregnenolone and 13.7% when they were taking placebos. The difference of 5.2% in favor of pregnenolone is not quite statistically significant (P=0.052).

In Department DO-2 the decrease in wastage for the six workers taking pregnenolone for one month was 34.2%. For the nine workers taking placebos during this same time it was 27.3%. On the switch over to placebos the six who had been on pregnenolone previously showed a scrap reduction for the next month of 18.3% in contrast to their pregnenolone scrap reduction of 34.2%. Figure 3 shows a marked increase in scrap production on the part of the 13 workers who had not received pregnenolone but only placebos during the first month. For all departments there is a wastage saving of 14.2% on placebos and 19.9 on pregnenolone. The net saving of 5.7% in favor of pregnenolone is barely significant statistically (P=0.032).

TABLE III

MEAN DECREASE IN PER CENT WASTAGE

Department	Group No.	No. of workers	Medication	Period 1	Medication	Period 2	Medication	Period 3	Medication	Period 4
DO-1	1	12	Placebo	0.6	Pregn.	25.4	Placebo	21.6	Pregn.	17.8
	2	12	Pregn.	8.2	Placebo	16.2	Pregn.	21.0	Placebo	16.3
DO-2	1	9	Placebo	27.3	Placebo	21.8	None	17.4	None	— 4.1
	2	6	Pregn.	34.2	Placebo	18.3	None	21.6	None	25.6

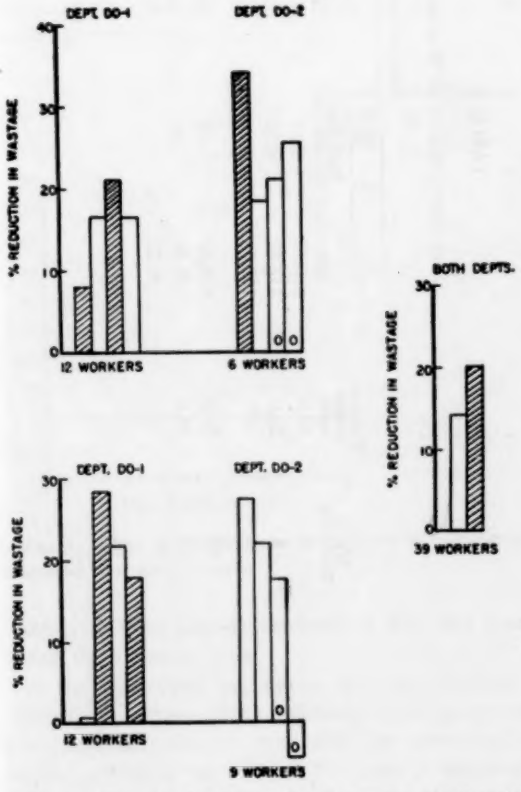

FIG. 3. Diagram showing saving of wastage as a function of medication. See legends to fig. 1 and fig 2 for interpretation. The pair of rectangles at right give mean results for entire 12 weeks and are not representative of specific periods.

From figure 1 we see that the increase in production occurred step wise in two departments (DH-2 and DO-1), in two others DH-1 and DC-3 the medication switchover are in 11 out of 12 cases attended by corresponding and appropriate rises and falls in production levels.

Pregnenolone administration apparently leads to increased production efficiency in all of the departments.

II

Procedure: In our second series of experiments we investigated the effects of pregnenolone dosage on production rates. Ninety-six workers in the main plant, and also in the adjacent Lensdale plant of the American Optical Company were divided into three groups. Group (1) received tablets containing 0.1 mgm. of pregnenolone daily which we regarded simply as a placebo, since this small amount of substance could not be expected to have any physiological effect. Group (2) received 25 mgm. of pregnenolone per day, and Group (3) 70 mgm. per day. The tablet triturates all looked and tasted alike and the workers were unaware of dosage differences. This régime was continued for twelve weeks and production efficiency

TABLE IV

EFFECT OF MEDICATION ON EARNINGS

Plant	No. of operators	Pregnen. dosage mgm.	Mean production efficiency in four-week periods: I Eff.	I Incr. over 0.1 mgm %	II Eff.	II Incr. over 0.1 mgm %	III Eff.	III Incr. over 0.1 mgm %	IV Eff.	IV Incr. over 0.1 mgm %	V Eff.	V Incr. over 0.1 mgm %	Mean effciency change over 0.1 mgm medication %
Main	19	70.0	100.83	2.66	100.22	0.34	103.56	4.33	109.27	6.51	104.92	3.70	+ 2.44
	18	25.0	100.39	2.12	100.30	0.42	101.11	1.88	102.76	0.00	101.63	0.31	+ 1.47
	16	0.1	98.17	...	99.88	...	99.23	...	102.76	...	101.32	...	...
Lensdale	12	70.0	107.21	7.86	106.83	8.48	108.53	11.43	116.18	9.48	112.31	9.49	+ 9.26
	14	25.0	98.46	— 0.89	96.51	— 1.84	96.68	— 0.42	104.95	— 1.65	102.08	— 0.14	— 1.05
	17	0.1	99.35	...	98.35	...	97.10	...	106.60	...	102.82	...	...

TABLE V

PER CENT DECLINE IN WASTAGE

Plant	No. of operators	Pregnen. dosage mgm	Mean production efficiency in four-week periods: I Eff.	I Incr. over 0.1 mgm %	II Eff.	II Incr. over 0.1 mgm %	III Eff.	III Incr. over 0.1 mgm %	% of mean efficiency change over entire period
Main	4	70.0	110.75	2.05	112.73	8.93	110.85	4.78	+ 5.18
	5	25.0	116.80	8.10	105.13	1.33	115.22	9.15	+ 6.19
	4	0.1	108.70	...	103.80	...	106.07	...	...
Lensdale	12	70.0	104.67	8.45	100.41	2.93	102.63	14.22	+ 8.53
	14	25.0	99.40	3.18	91.11	— 6.37	92.07	3.66	+ 0.16
	17	0.1	96.22	...	97.48	...	88.41	...	...

was measured as described above, and recorded in monthly periods referred to in Table IV by Roman numerals.

Table IV shows the results of this study and it is clear that the 70 mgm. dose of pregnenolone significantly enhances production above the 0.1 mgm. level while the increase due to 25 mgm. is not significant. No medication was given during periods IV (3 weeks) and V (4 weeks) but the gain continues into these periods for workers who had been taking the 70 mgm. pills.

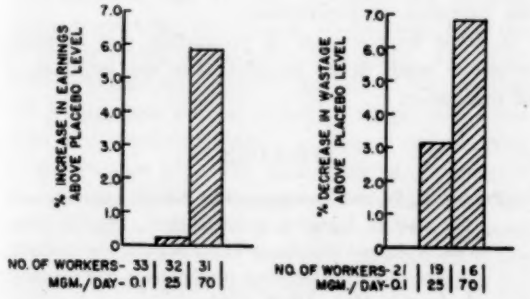

FIG. 4. Effects of different doses of pregnenolone over a period of three months on piece work earnings and on quality of workmanship.

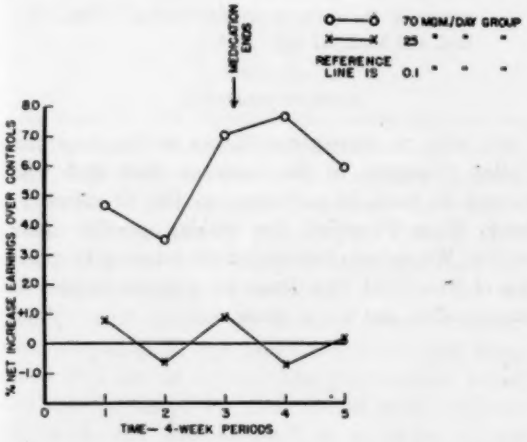

FIG. 5. Effect of pregnenolone on piece work earnings in successive four-week periods.

In the Main Plant one group, the "Pad Spinners," showed no differences in efficiency from group to group and their efficiency was below the control value of the preceding ten weeks. This was a group of 11 women and some diminution in the pressure of work occurred in the department at that time. In the other three departments efficiency improved as may be seen by comparing the 25 and 70 mgm. groups with the 0.1 mgm. group. All the data including those from the "Pad Spinners" are recorded in the table.

Table V shows the per cent decline in wastage and repairs. Data were available from only one department in the Main Plant.

Figure 4 summarizes the data of Tables IV and V and shows effects of pregnenolone in 25 and 70 mgm. doses in enhancing production above 0.1 mgm. (placebo) levels. The effects of the 70 mgm. dosage are statistically significant, ($P < 0.01$). Figure 5 shows a plot of per cent improvement in earnings on 25 mg./day and on 70 mg./day as compared to control levels when the workers were taking 0.1 mg./day pregnenolone. Five four-week periods are plotted. The last two of these periods correspond to times when the workers were taking no medication.

DISCUSSION

The experiments described in this paper present additional evidence that pregnenolone facilitates complex psychomotor behavior. In previous papers (2, 3) we have regarded this facilitation as some form of antifatigue phenomenon because of modifications of the work decrement curves in pursuit meter tests in cases in which pregnenolone appeared to be beneficial. It is interesting that Torda and Wolff (4) have reported that pregnenolone together with estrone and estradiol of many steroids tested, are the only ones that promote the synthesis of acetylcholine in vitro. They report that corticosterone and some other steroids actually depress acetylcholine synthesis. While we do not understand the mechanism of action of pregnenolone it is tempting to speculate that its facilitating action may be related to improved transmission of nerve impulses due to enhancement of acetylcholine production.

Some of our data suggest that pregnenolone facilitates learning. For example, it is seen that in periods IV and V (Table IV) and fig. 5 when all medication was withdrawn the production rate in the groups that had taken 70 mgm. of pregnenolone continued high in both Lensdale and the Main Plant, whereas the 25 mgm. groups continued at a relatively low level. This would imply that the higher dosage of pregnenolone facilitated a learned improvement which was for the most part retained. In fact, the weighted net gain over the control group of 7.1% of all 70 mgm. recipients during period III is exceeded in period IV (mean gain 7.6%) and declines to only 5.9% in period V. The data for bayonet production described in a preceding paper (3) also show a retention of improvement of production at the termination of the medication series. The workers seem to have learned

to do better work and do not return to their pre-medication levels.

If one inspects figure 2 it is noteworthy that those workers in all departments excepting DO-2, in going from placebos to pregnenolone, show a net improvement of 2.2%, whereas those going from pregnenolone to placebos show no decrement on placebos over their improved pregnenolone levels. May this not best be interpreted as a carry-over of learned facilitation during the pregnenolone periods?

In figure 3 describing saving in wastage, those workers starting the experiment on placebos show on shifting to pregnenolone a reduction in wastage of 28.2% whereas those starting on pregnenolone do not show an increase in wastage when they are shifted to placebos, but rather a further improvement of 8%. Does this again perhaps imply a facilitation of learning carried over from the pregnenolone period?

We feel that it is desirable to test further the hypothesis that pregnenolone may facilitate learning. Experiments with rats in this connection should prove of interest.

SUMMARY

1. A study of piece work production has been made of 173 male and female workers making optical goods when they were taking placebos and when they were taking pregnenolone.

2. A significant increase of 4.2% in overall production was found for 77 workers taking 50 mgm. pregnenolone per day over their previous production levels. This is 1.3% higher than their levels on placebos.

3. Decrease in wastage and repairs for 39 workers amounted to 18.9% when they were taking pregnenolone and 13.7% when they were taking placebos as compared to their pre-experimental levels.

4. Ninety-six workers were studied for three months. A third of them took 70 mg. per day pregnenolone pills, another third took 25 mgm./day pills, and a third took 0.1 mgm./day pills (a placebo for all practical purposes). The 70 mg. group showed most pronounced improvement in earnings and in the saving of wastage. The 25 mgm./day group fell between the 70 mgm./day and the 0.1 mgm./day groups. There was thus demonstrated differences in dosage on improvement of industrial production resulting from the ingestion of pregnenolone.

5. Some improvement of production due to pregnenolone tends to be retained after the termination of medication.

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EFFECT OF PREGNENOLONE ON THE ABILITY TO PERFORM PROLONGED PSYCHOMOTOR TESTS

I. GRAHAM-BRYCE, M.A., A. K. BULLEN, A.B., AND W. H. FORBES, PH.D.*

INTRODUCTION

The present series of experiments was undertaken by Isabel Graham-Bryce and W. H. Forbes after a discussion with Drs. Hudson Hoagland and Gregory Pincus concerning the striking results they were obtaining by giving pregnenolone to aviators. In certain laboratory tests their subjects performed an exacting and boring task over a period of hours, and when given this substance showed a distinct improvement in performance (3). The present set of experiments was run upon the same type of apparatus with the same dosage of the drug and upon the same general plan but the results were strikingly different. It is the purpose of this paper to compare the two sets of experiments and attempt to explain the discrepancy in the results. Unfortunately, Mrs. Graham-Bryce was compelled to leave before the completion of the work and so it was finished and written by Adelaide K. Bullen and W. H. Forbes.

METHODS

Six subjects were chosen for this study, four women and two men. They were trained on the "targetmeter" until their performances were reasonably constant (minimum 10 hours practice), and then their control periods of three weeks were begun. During these periods they received placebos (1 tablet per day) and were on the targetmeter twice per week. Then the placebos were changed for tablets of identical appearance containing 50 mg. pregnenolone, one pill being taken each day as before. The pregnenolone period also was continued for three weeks with two tests per week and was followed by a second control period similar to the first. The subjects, therefore, continued on a constant régime throughout and were unaware of the change made during the experimental period. As a further control, one subject was continued on placebos throughout the whole nine weeks and another subject was run for five periods instead of three (two on pregnenolone and three controls).

The tests which were given twice a week consisted of runs of 100 to 120 minutes on a targetmeter of the type developed by Dr. S. S. Stevens and modified by Dr. H. Hoagland (3) and further by Dr. W. MacLaren. On this machine the subject tries by means of a "joy stick" and rudder bar to keep a pair of lights on a pair of photoelectric cells which follow a random course. Scores are based on the percentage of time the subject kept the two lights on the two targets. This apparatus was checked at the beginning and end of each run by scoring a five minute test run with a constant speed rotating light interceptor. Before and after runs, the subject checked a subjective analysis sheet similar to Pincus and Hoagland's "strain scale" (see fig. 1) in which the subject roughly estimated his degree of fatigue, attention, sleepiness, boredom, etc. An effort was also made to measure the threshold of light discrimination of the subjects before and after the run on a modified Hecht adaptometer but the results were irregular and appeared to depend so largely upon the previous activities of the day (exposure to sunlight etc.) rather than upon the targetmeter run that they were discontinued.

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RESULTS

No benefit from pregnenolone was demonstrated by these experiments though the data was analyzed in various ways to bring out any differences that might exist. Table 1 gives the data. Figure 2 was made by averaging for each subject all the curves obtained during the control periods thus getting an average control curve (dotted line), and by averaging all the curves during the pregnenolone period and getting an average pregnenolone curve (solid line). There is no difference in the shapes of the curves, which indicates that there was no effect upon the rate at which fatigue developed during the course of each test. Neither is there any significant difference in the height of the curves (*i.e.*, in the average score). It is tempting to say that Subject No. 1 who was a good subject and steady performer showed a definite benefit as she showed a rise of 4 points, that is from being on the target 50% of the time to being on 54%. On the other hand, Subject No. 2 showed an almost equal fall.

This method of representation does not show the possible changes over a period of weeks, so figures 3, 4, and 5 have been prepared. In figure 3 the top line gives the average score in each test for the subject who went for 5 periods of 3 weeks each. During the periods marked A, she was on placebos and during

those marked B on pregnenolone. There is no consistent difference. The two lower curves in this figure will be referred to later.

Figure 4 shows for each subject given pregnenolone the average values for the control and experimental periods, for the whole run in the top row and for the second half of the run in the lower row. From the presentation it looks as if Subjects 1 and 6 both benefited slightly from pregnenolone but a critical examination of the data does not justify this conclusion. The apparent benefit to No. 6 was caused by spurts of performance during the last 15 minutes of the test (see fig. 2). He was an erratic subject and these spurts appeared to be due to increased effort and focusing of attention. The approaching end of a boring task stimulated this subject to greater activity. It would be very rash to attribute these spurts to the drug.

Figure 5 is plotted in the same general manner as figure 3 but gives the average results on our whole experimental group (open circles and solid line, using left hand and bottom scales). The first point is the average score of all 5 subjects on their first test (after the initial training period), the second point the average score for their second test and so on. The size of the circles roughly represents our probable error. The points show that although the subjects had been trained by at least 10 hours' practice before the series started, so that they were no longer acquiring further skill at a rate which could interfere with our results, still they had not reached the end of the learning process which evidently continued during the whole of the nine weeks that the experiments lasted. This evidence that learning had not stopped was welcome because we believe that the period before the reflexes have been completely set and hardened into a rigid

SAMPLE SUBJECTIVE ANALYSIS SHEET

1. Name ..... 2. Date ..... 3. Hour .....

4. Type of test (circle correct type): Preflight Postflight

5. If postflight test, give duration of flight: Hours ..... Minutes .....

6. Type of medication (indicate by code letter) .....

Place a circle around the estimated number which best described your attitudes, feelings, etc., during the latter part of the preceding preflight or flight period.

I FELT:

1—2—3—4—5—6—7—8—9

very peppy — peppy — indifferent — fatigued — very fatigued

1—2—3—4—5—6—7—8—9

very relaxed and contented — relaxed and contented — indifferent — strained and irritated — very strained and irritated

1—2—3—4—5—6—7—8—9

very interested — interested — indifferent — bored — very bored

1—2—3—4—5—6—7—8—9

very attentive — attentive — slightly attentive — inattentive — very inattentive

1—2—3—4—5—6—7—8—9

very wide awake — wide awake — indifferent — sleepy — very sleepy

Place any other introspections on back.

FIG. 1

pattern is more suitable for showing up slight effects than the postlearning period. There is no evidence that pregnenolone had any effect.

In order to show the striking contrast between our results and those of Pincus and Hoagland (3) we have, with their permission, superimposed their curve (dotted line) on ours (solid line) in figure 5. Their points have been omitted, ours are given by the circles. There is a slight difference in the manner of representing time. Our data is plotted by tests while Dr. Pincus and Dr. Hoagland plotted their data by days, but the time intervals between tests were so similar in our work and in theirs that the two curves are quite comparable. The only difference of any possible significance was that their subjects were on the drug for 16 days and ours for 21.

The subjective analysis gives the attitudes and feelings of the subject before and after the tests. Inspection of the results for all the subjects shows that though the subjective feelings differed greatly from one individual to another they did not vary with pregnenolone except possibly in the case of Subject No. 5 who, if anything, felt worse during the pregnenolone period. A sample curve (Subject No. 2) is shown in the lower part of figure 3. Scores have been plotted inversely so that a lower score indicates greater fatigue and strain. It will be noted that the least fatigue from the targetmeter runs appears during the second placebo period. That this is not a holdover from the pregnenolone is evidenced by the lack of a similar result in the fifth period (third placebo).

Various other aspects of the data were analyzed in an effort to obtain some confirmation of the results reported by Pincus and Hoagland but no confirmation was forthcoming. For example, the ratio of the score (percentage of time on targets) during the first half

TABLE I

CHRONOLOGICAL LIST OF TARGETMETER SCORES OF INDIVIDUAL SUBJECTS DURING EXPERIMENTAL PERIODS

Subject	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Control	45.0	49.0	66.7	62.0	51.0	45.1
	48.0	44.0	67.7	61.0	69.0	33.1
	46.8	52.0	68.7	62.0	46.0	55.3
	47.5	45.0	63.1	61.0	68.0	30.2
	48.1	60.0	64.5	67.0	44.0	
	50.0	58.0	69.2	...	40.0	
Pregnenolone	*52.4*	*53.0*	*66.8*	62.0 *	*56.0*	*46.4*
	55.9	*50.0*	*68.8*	66.0 *	*57.0*	*58.2*
	47.9	*55.0*	*70.8*	63.0 *	*52.0*	*46.0*
	55.5	*45.0*	*70.8*	64.0 *	*67.0*	*41.9*
	58.0	*62.0*	*71.6*	66.0 *	*45.0*	*35.0*
	51.6	*63.0*	...	...	*57.0*	
Control	53.7	61.0	72.3	64.0	52.0	44.1
	41.5	62.0	72.0	61.0	56.0	29.5
	51.4	58.0	67.7	64.0	50.0	58.6
	51.6	62.0	69.8	59.0	81.0	47.3
	53.1	55.0	...	69.0	52.0	37.8
	53.5	54.0	...	...	57.0	40.0
Pregnenolone	...	*59.0*				
	...	*62.0*				
	...	*63.0*				
	...	*63.0*				
	...	*51.0*				
	...	*58.0*				
Control	...	64.0				
	...	69.0				
	...	73.0				
	...	70.0				
	...	69.0				
	...	70.0				

* No pregnenolone was given this subject.

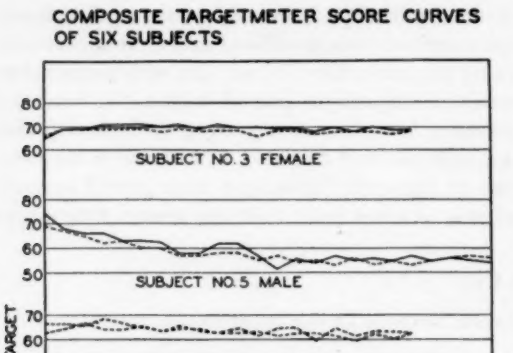

FIG. 2. Composite targetmeter score curves of subjects.

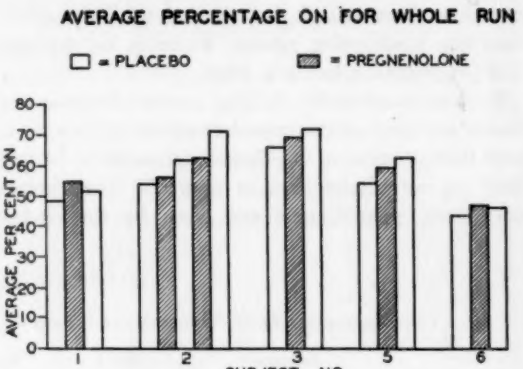

FIG. 4. Average percentage time on target.

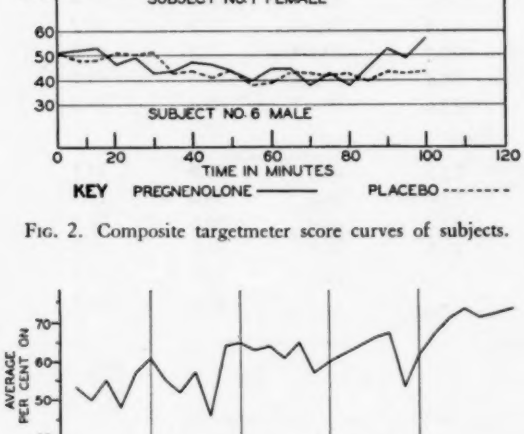

FIG. 3. A = Placebo; B = Pregnenolone. Upper: Graph of average percentage time on target for complete runs for Subject No. 2.

Lower: Subjective analysis (strain) scores same subject. - - - - - before run. ——— after run.

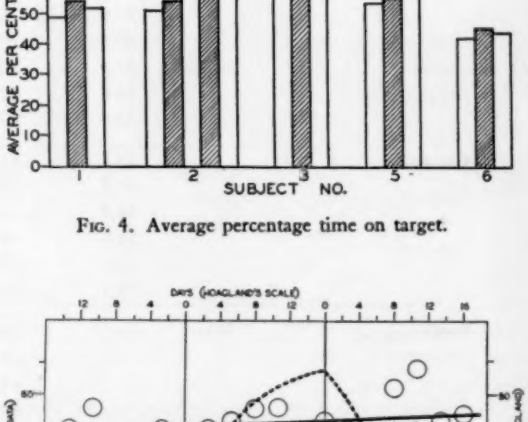

FIG. 5. Average scores for our five subjects compared with Pincus and Hoagland's results for seven aviators. Circles and solid line our data; dotted curve, Pincus and Hoagland.

of the run to the score during the second half was not affected by the pregnenolone nor was the ratio of the score during the first ten minutes to the score during the last ten. Had the pregnenolone had any influence upon the rate at which fatigue developed these ratios would have changed. One accidental observation, namely that when on one occasion a subject got only one and one-half hours' sleep during a busy night his performance the next day was far below his usual level, indicated that our apparatus and method were reasonably well adapted for showing variations in the degree of fatigue.

DISCUSSION

Having shown that our results differed fundamentally from those of Drs. Pincus and Hoagland, we shall proceed to the discussion of the reasons for the difference. The most plausible clue is found in the following quotation from Dr. Hoagland:

"Objectively measured antifatigue effects of pregnenolone are variable from person to person. Some show no improvement and report no subjective symptoms from its use but a substantial number have reported feeling less fatigued and better able to cope with their jobs when they were taking it as contrasted to periods when they were taking placebos. . . . . We are convinced that pregnenolone is most effective in combating fatigue where motivation is high and where men are working under really trying conditions. Our hard worked pilots who were professionally interested in making high scores on the target meter showed more improvement on pregnenolone (average 25 per cent) than did our paid civilian subjects (average 10 per cent) who were not under as much working stress and whose interest in the experiment was less. In a third industrial group that we investigated in which there was no incentive pay pregnenolone did not increase production over placebo levels" (1).

On the whole our subjects were not under any very great stress. Their jobs were reasonably secure. There was no connection between their performance on the targetmeter and their success or failure, either in their jobs or in their social activities. They were, in short, like the industrial group which Dr. Hoagland mentions above and who showed no improvement. This point deserves emphasis. If one investigator finds, as in the quotation above, that three different groups show three different responses depending upon the amount of strain they are under, then different investigators working upon different groups will report the most bewildering diversity of results. To get any coherent body of experimental data it is essential that both the subjects and the situation be known and described as fully as possible, and this presents difficulties.

In our experiments Subjects Nos. 1, 2, 3, and 4 were steadier performers than Nos. 5 and 6 as can be seen from figure 2. The first four were mature women (31 to 43 years of age), varying in personality traits but all disciplined intellectual workers. Nos. 5 and 6 were college boys, young and rather erratic. The greater regularity of the women's scores is probably not due to sex but rather to age and character. The women seemed more highly motivated than the men and conscientiously tried to do their best. However, it is not likely that they were nearly so highly motivated as the pilots described by Pincus and Hoagland nor were they under so great a general stress. Also these women were used to quite boring work which involved considerable repetition and monotony while requiring close attention. Both boys on the other hand were unused to this type of work, became extremely bored and would gladly have discontinued the experiments before the end of the series though they had originally expressed interest in them.

Dr. Hoagland in a personal communication has informed us that in some recent work upon civilians and psychiatric patients who were not particularly highly motivated he has obtained inconsistent and inconclusive results which were in sharp contrast to those obtained upon the highly motivated aviators. This observation together with the case cited above in which industrial workers with low incentives showed no effects from pregnenolone demonstrates dramatically the necessity of taking into account a number of variables whose exact measurement is impossible at present. Motivation—a factor which is both critical and difficult to control—is probably the most important single variable, but when motivation is low other factors, *e.g.*, distraction, subjective feelings, reveries, etc., become of increasing importance.

In an effort to observe the effects of distractions and of companionship a few experiments were run in which two subjects worked side by side, each on his own machine. One subject, an athletic young man, was a steady scorer at all times and could joke and carry on a conversation with his companion without affecting his own usual scoring ability. The other subject, No. 6, a less athletic person, was more highly reactive to stimuli and more distractible. He was an erratic performer even when alone and when the other subject was present his periods of inattention increased and at times when spoken to he would even turn away from the target to look at his companion which resulted in a very irregular pattern of performance and a low average score.

We feel from the slight evidence from No. 6 and his companion that there is reason to expect that different subjects will be very differently affected by a given amount of distracting stimuli during the test. In general, the present findings emphasize the fact that different factors enter into the total picture of an individual's psychomotor behavior. The physique, temperament, motivation, social situation, conditioning, and other aspects of the test situation and subject must be considered. Without this sort of auxiliary information, the correct interpretation of a given level or pattern of scoring becomes extremely difficult; a single end-result like performance is an uncertain guide to analysis. It is evidently not equally satisfactory to measure the effects of pregnenolone with *any* group of subjects. Judging from performance on the targetmeter, aviators

under general stress appear to react differently to pregnenolone than do civilians who are not under stress. While these experiments have not established any adequate explanations for the observed differences, they do suggest possibilities for future investigations of the influence—too often ignored—of constitutional and social factors upon prolonged and exacting work.

SUMMARY AND CONCLUSIONS

1. Pregnenolone administered to five civilian subjects did not produce beneficial results on prolonged psychomotor tests as it had in the case of seven army pilots tested similarly by Pincus and Hoagland.

2. A comparison of the two sets of experiments suggests that positive effects of the drug will be shown only by people who are under stress.

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The loyalty of both paid and unpaid subjects during this lengthy series of experiments is appreciated and we wish to thank Barbara Watkins and Barbara Kimball who gave technical assistance throughout the studies.

DETECTION AND MANAGEMENT OF PERSONALITY AND PSYCHOSOMATIC DISORDERS AMONG INDUSTRIAL PERSONNEL

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The aim of this investigation was to determine the practicability and value of psychiatric appraisal of employees of a large industrial organization by means of interviews, and rapid paper and pencil procedures such as the Cornell Selectee Index [1] (8, 4) and the Cornell Word Form (5, 9, 10), to insure proper placement and to maintain mental health.

The industrial situation requires stability in relationships among human beings in supervisory and subordinate capacities and among those of equal position on the industrial scale. It usually requires persistent application to work which must be done in a certain way in a given amount of time so as not to interfere with the production schedule. It involves stresses such as smoke, heat, noise and monotony. Should serious personality conflicts arise because of maladjustment either to work conditions or to life situations, absenteeism, high accident rate, grievances and lowered working efficiency or complete failure at work, may result.

METHOD

SAMPLES STUDIED

This study is based on the examination of 679 persons employed at the Caterpillar Tractor Co., Peoria, Illinois, all of whom received psychiatric interviews. Four hundred and fifteen received in addition either the Cornell Selectee Index or the Cornell Word Form; 350 completed both forms.

The largest body of the data here presented was collected on veterans (508). The remainder concerns employees who had not seen military service. The distinction is important for two reasons: a) the veterans were more or less sure of getting a job if they were at all employable; b) an effort was made to create for veterans with personality disorders working conditions involving minimal stress in order to give them time to adjust to civilian working conditions.

THE PSYCHIATRIC INTERVIEW

All subjects of this investigation were interviewed by a psychiatrist to ascertain the presence of personality and psychosomatic disturbances, such as continued or periodic anxiety or depression, delusions and hallucinations, headaches, gastrointestinal complaints, palpitation, difficulty in breathing, attacks of faintness, dizziness and asthma, and arterial hypertension. It further aimed at uncovering histories of alcoholism or criminal behavior and the identification of shut-in tendencies, excitability and irritability, impulsive behavior, worrisomeness, lack of interest and sexual difficulty. The inquiry also explored such topics as hobbies, relationships with other people, marital status and childhood history.

The technique used in acquiring this information was an easy-going method of questioning, inducing the subject to talk freely and spontaneously. The interview was usually begun with a discussion of the subject's interest in his work and his health record and then went on to the topics mentioned. If the subject became uneasy and refused to continue the discussion it was explained that the purpose of the interview was to ascertain his condition of health in order to place him adequately or to help him with his difficulties. This explanation was satisfactory in most instances. If information was thereafter withheld no pressure was exerted to overcome reluctance.

Subjects giving evidence of lower than average mentality were given an intelligence test.

The personality and psychosomatic disturbances revealed during interview were classified as mild, moderately severe and severe on the basis of the nature and intensity of symptoms. They were called mild if the only symptoms were such complaints as occasional gastric distress or sleeplessness. More frequent, persistent or intense symptoms of the same type were rated as moderately severe or severe.

* From the New York Hospital and the Departments of Medicine (Neurology) and Psychiatry, Cornell University Medical College, New York, N. Y., and the Medical Division of the Caterpillar Tractor Co., Peoria, Ill.

This is the first study of a project devoted to the development of a psychiatric program for industrial organizations. It was carried out with the aid of a grant from the Caterpillar Tractor Co.

[1] Test blanks and scoring materials are available to responsible agencies on request to the authors at Cornell Selectee Index Project P206, Cornell University Medical College, 1300 York Ave., N. Y. 21.

OTHER PROCEDURES

Two pencil and paper procedures requiring ten minutes each to complete and less than one minute to score were used in evaluating the majority of subjects.

The Cornell Selectee Index is a method for determining directly the degree of personality and psychosomatic disturbance. It is a questionnaire in which responses represent a standardized psychiatric history and preliminary interview. Some of the symptoms inquired about are relatively mild, e.g., "Do you often have difficulty in falling asleep or staying asleep?" Others, so-called "stop questions," concern serious symptoms, e.g., "Has any doctor ever told you that you had ulcers of the stomach?". The test score is a quantitative expression of the presence or absence of disturbance, while the individual responses may be used qualitatively in psychiatric interview.

The Cornell Word Form aims at the detection of psychosomatic and personality disturbances by an indirect method. It consists of a list of stimulus words each of which is followed by two response words. The subject is asked to encircle whichever of the two words seems to him to be related to the stimulus word. The choice of one word rather than the other is the indication of disturbance. For example, HEAD—mind, hurt; the subject suffering from headaches may choose the word "hurt." The number of such responses is an indication of the presence or absence of personality disturbances.

RESULTS

SERIES I—VETERANS

Psychiatric Examination of Veterans Applying for Employment—New and Former Employees

A total of 508 veterans was examined. Of these seventy-eight had been discharged from the armed forces for neuropsychiatric reasons. Eighteen of the seventy-eight showed only mild neuropsychiatric symptoms at the time of applying for employment. Two hundred and seventy veterans had been discharged because of medical and surgical disorders; nineteen of these had symptoms of moderately severe and severe personality disturbance (6). (See Table I.) The remainder were discharged for other reasons. Table II lists the number of those with moderately severe and severe personality disturbances according to predominant symptoms.

At the time of application for employment veterans were classified as being 1) employable without restriction; 2) employable with limitation of working hours and modification of environment; or 3) not employable at present but employable later. All considered "normal" or as having mild or moderately severe disturbance and the majority of those with severe disturbance were considered employable.

TABLE I

CLASSIFICATION OF VETERANS ACCORDING TO PRESENCE OR ABSENCE OF PERSONALITY AND PSYCHOSOMATIC DISTURBANCES

Number of veterans with moderately severe or severe personality disturbances, discharged from the armed forces for this reason	60
Number of veterans discharged because of medical or surgical disorders, also manifesting moderately severe or severe personality disturbances	19
Number of veterans without significant personality and psychosomatic disturbances	429
Total	508

TABLE II

VETERANS WITH MODERATELY SEVERE AND SEVERE PERSONALITY DISTURBANCES CLASSIFIED ACCORDING TO DIAGNOSTIC CATEGORY

Psychoneuroses	
Anxiety states with predominant symptoms of	
Anxiety	21
Depression	6
Sleepwalking	1
Enuresis	1
Gastrointestinal complaints	14
Back and foot pain	5
Cardiovascular dysfunction	1
Vertigo	1
Conversion Hysteria	1
Hypochondriasis	1
Neurasthenia	1
Startle reaction	7
Psychosomatic Disturbances	
With readily discernible psychopathology	
Peptic ulcer	5
Asthma	2
Hypertension	3
Headache	9
Colitis	1
Without readily discernible psychopathology	
Peptic ulcer	1
Hypertension	1
Psychopathic Personalities	
Overdependent	3
Alcoholic	1
"Troublemaker"	1
Suspicious	1
"Distant" or "shut-in"	1
Total	79

Placement of Veterans

All personnel involved in hiring, training, and placing of veterans, namely physicians, counselors and foremen, manifested particular interest and understanding, especially in regard to those with personality disturbances. Thus, the latter were generally placed at light work. Duties involving heavy machinery, noise, smoke, and pressure for rapid work were avoided. Those who had special skills were permitted for a month or two to limit their work to a few hours each day, interrupting it in case of tension or fatigue. In many instances these men started in the relatively quiet "training shop" working at machines but not as part of routine production. As they increased the number of their hours of work they were fitted into regular production but with permission to work only to tolerance. Gradually they assumed full-time working duties.

That this approach was profitable is illustrated by the following case history which shows the effect of proper placement in cases where failure was due to improper placement.

CASE 1. A man with an anxiety state failed on his job because of his noisy environment. He succeeded when placed in compatible surroundings.

A twenty-one-year-old man had been in the Army for six months. He had become an orphan at the age of five and was placed in an orphanage for five years, after which time he was adopted. He had not been away from home until entering the Army and had always been shy, had few friends, and did not participate adequately in social activities. He had a "breakdown" three months after entering the Army; his main symptoms were fears when standing guard at night and urinary frequency and discomfort. Later, while on the genitourinary ward of a military hospital he developed panic reactions and was afraid that the physicians would operate on him, cut him up and severely mutilate him. He was discharged from the service three months later. Following his return home, he stayed with his family most of the time and although he had nightmares, was very shy; and still had urinary complaints, he improved considerably and applied for a job in a printer's shop. He worked regularly and with sincere effort but the noise of the work bothered him. He did not complain but lost twenty pounds in three months. He quit his job, stayed home for two weeks and then applied for work at the Caterpillar Tractor Company. His condition was classified by the physician on interview as a moderately severe anxiety state, employable in a restricted manner. He was given a job as an errand boy in the office, carrying messages and mail. He liked his job, gained weight, became more outgoing and, at the time of this report, had been working steadily for ten months.

Follow-Up Procedures on Veterans With Personality Disturbances

As shown in Table III initial psychiatric evaluation was a reliable means of determining whether personality disturbances would interfere with work adjustment unless the subject was given psychiatric aid. It will be seen that the number referred for further psychiatric care among those classified as without significant personality disturbances, is only one-sixth of that for those with personality disturbances.

TABLE III

NUMBER OF VETERANS WITH PERSONALITY DISTURBANCES REQUIRING FURTHER PSYCHIATRIC CARE AS COMPARED TO THOSE WITHOUT SUCH DISTURBANCES

	Number returned for psychiatric care	Per cent returned
Seventy-nine veterans with personality disturbance	18	23
Three hundred and seventy-three veterans without significant personality disturbance	10	3.7

Of the ten veterans in the "normal" group referred for psychiatric care, four are a part of the group of eighteen who had been discharged from the armed forces for neuropsychiatric reasons but had only mild manifestations at the time of examination. These eighteen had been placed on a full time working schedule. If these eighteen had been treated as a separate group, the percentage of veterans referred for psychiatric care from the group with neuropsychiatric disturbances as compared to the "normal" group, would have been higher than given above.

It will be seen in Table IV, Group D, that the percentage of persons working adequately is almost the same among the veterans with personality disturbance as those without. It may be inferred that this is the result of the program of selective placement and psychotherapeutic measures.

It may be added here that the rate of turnover among veterans was nearly the same as that for employees without military experience. (Approximately two persons left the plant for every three hired during the period of this investigation.) The rate of turnover among veterans formerly employed was lower than among those hired for the first time.

CASE 2. A man whose ship had been torpedoed developed serious battle reaction. He gradually regained his emotional health and full employability.

A nineteen-year-old former employee of the company had entered the Navy in 1944. He participated successfully in several engagements until his ship was hit by a Japanese suicide plane and sunk. He floated in the water for six hours and was under constant strafing by enemy aircraft. Following this incident he became restless and jittery, lost his appetite, lost weight, had severe pain in the stomach, headaches, fainting spells, and recurrent catastrophic dreams. He was discharged from the Navy. When he applied for employment he still had most of his symptoms although he had improved somewhat. On psychiatric examination he was classified as having a severe anxiety state. He was reassigned to his former job, but on a limited schedule, being told to leave his work whenever he found it fatiguing. The number of his working hours and the heaviness of his work were gradually increased. He gained twenty-five pounds in six months, his appetite improved, his sleep was untroubled, nightmares occurring very rarely, his headaches and abdominal pains disappeared. He still showed some tremor of the hands, and cold and clammy extremities. His foreman stated that he was doing a good job, was conscientious and efficient at his work. Except for excessive talkativeness his adjustment was entirely satisfactory.

TABLE IV

COMPARISON OF WORK ADJUSTMENT OF VETERANS WITH AND WITHOUT PERSONALITY DISTURBANCES

Classification	Group A		Group B		Group C		Group D	
	#	%	#	%	#	%	#	%
Three hundred and seventy-three * veterans without significant personality disturbance	100	27	97	26	13	4	163	43
Seventy-nine veterans with personality disturbance	18	22	27	34	3	4	31	40

Group A is comprised of persons who left their jobs for reasons such as: going into business for themselves; getting a better job; leaving the community.
Group B is comprised of persons who left their jobs because they did not like the work; they did not like the wages; they found the work too difficult; or they left without explanation.
Group C is comprised of persons who were discharged because of uncooperativeness or very poor attendance.
Group D is composed of persons who were working adequately at the time of writing.

* Fifty-six of the 429 veterans without significant personality disturbance were found to be physically unfit for work or did not report for work after being hired.

Comment

The veteran with personality disturbance required psychiatric care in order to increase his working efficiency. The administration of psychiatric interviews and pencil and paper procedures to veterans applying for employment at the Caterpillar Tractor Company proved a practicable and efficient routine and was usually welcomed by the veteran. The findings were useful in placing these men so as to make the fullest use of limited but increasing capabilities. The conditions under which recovery may occur are created in this way (1).

SERIES II—EMPLOYEES WHO HAVE NOT SEEN MILITARY SERVICE

In order to discover and evaluate the effectiveness of psychiatric appraisal and care in various aspects of the industrial situation persons in the following categories were examined by means of psychiatric interview, the Cornell Selectee Index and the Cornell Word Form:

1) Persons applying for employment including those formerly employed.
2) Persons already employed, in order to discover the incidence of neuropsychiatric disturbance and the effect of therapy with a view toward instituting periodic psychiatric examinations.
3) Employees requesting transfer to other positions.
4) A group of employees who recognized the origin of their difficulties in working and requested therapy.

1. Persons Applying for Employment Including Those Formerly Employed

Ninety applicants for employment were routinely interviewed by personnel interviewers and evaluated as to whether they could be profitably employed. They were also examined psychiatrically by a physician whose opinion as to their employability was not made available to the personnel interviewers.

Two purposes were to be served by this method: first, it was desirable to know whether psychiatric examinations could be made in this situation without arousing resentment; and second, by following the careers of these individuals, to find out whether statistically significant correlations could be established between personality disturbances arising during employment and the results of psychiatric interviews and procedures. Thus, the results of psychiatric interviews and procedures could be used in furthering proper placement of employees and in the prevention of personality difficulties. Statistical results of this survey by

personnel interviewers and psychiatric interviewers will be the subject of a later communication. Classification according to the presence and degree of personality disturbance is shown in Table V.

TABLE V

CLASSIFICATION OF PERSONS APPLYING FOR EMPLOYMENT ACCORDING TO PRESENCE AND DEGREE OF PERSONALITY DISTURBANCE

Classification	#	%
"Normal"	51	57
Mild	22	24
Moderately severe	12	13
Severe	5	6
Total	90	100

Placement

Psychiatric evaluation was found to be useful in placement of new employees by assigning those of small capacities to positions within their scope, and by utilizing fully the abilities of others. The following case history illustrates the former circumstance.

CASE 3. A man with low intelligence but stable personality was adequately placed in a simple job upon the advice of the psychologist.

One of the personnel interviewers asked the psychiatrist to see a man who was applying for employment. The interviewer was uncertain as to the employability of the applicant. The psychiatrist, on interviewing the subject, came to the conclusion that he was a mental defective of moronic intelligence. An intelligence test given by the psychologist confirmed this impression. On the other hand, the personality of the applicant seemed adequate; he was serious-minded, conscientious, and industrious. The psychologist recommended that the applicant be placed in a simple job such as sweeping the yard or carting away waste material. This was done. He liked his work so well that he inquired whether he was going to be paid for it. After one month he was still performing adequately.

This method of placing persons with mental retardation is a recognized procedure in psychiatric and psychologic clinics (2, 11), but is not generally utilized in industry. Without this evaluation this man might not have been employed at all or might have been placed in a job above his mental capacity where he would unquestionably have failed.

Prevention of Poor Work Adjustment

Poor work adjustment which would lower work efficiency was prevented by the use of psychiatric knowledge. One method of carrying out this aim is illustrated by the following case history.

CASE 4. A man, sensitive about his appearance, became a problem when exposed to the teasing of fellow workers. Brief psychotherapy and discussion with his foreman remedied the difficulty.

The applicant was a nineteen-year-old man, very tall and thin, with asymmetry of the face and extremities. He was not incapacitated but was very self-conscious about his appearance and had feelings of inadequacy. He stated that he often fought with his brothers and sisters if they remarked about his appearance and that he terminated friendships with people who called him "Chubby." He was assigned to the machine shop, where his work was satisfactory but he became angry and sulky if his fellow workers called him "Chubby." His reaction only produced more jokes at his expense. The foreman complained to the personnel department that the man's presence was disrupting the morale of the department. He was transferred to another section and it was explained to him that people meant no harm by using his nickname. His new fellow workers were asked by the foreman not to make jokes at his expense. These measures have so far been effective in forestalling trouble.

Comment

In the hiring and placement of this group of ninety new employees the psychiatric interviewing and other procedures have been carried out without arousing suspicion and resentment, and have proved effective in preventing some kinds of personality disturbances making for reduced efficiency.

2. Persons Already Employed Examined in Order to Discover the Incidence of Personality Disturbances and the Effect of Therapy With the Aim of Instituting Periodic Psychiatric Examinations

In this experiment thirty-one female office workers were asked to fill out the Cornell Selectee Index and the Cornell Word Form and were interviewed by the psychiatrist with the purpose of determining their state of emotional health. It was made clear that this was a voluntary procedure, and that they were under no obligation to participate. None of the women objected to the procedure and two of them requested a second interview for help in solving their problems. The following table illustrates their classification according to the presence or absence of personality disturbance.

It was felt that making available to employees periodic psychiatric help would increase working efficiency. The following case history illustrates the efficiency of such help.

Case 5. A woman was afraid her marriage would fail and made errors in her work. Brief psychotherapy relieved her symptoms.

A woman twenty-four years of age whose husband was stationed in the Pacific, was afraid that on his return they would not get along and that he would want a divorce. She was also afraid that if she were to become pregnant she might die in childbirth. The psychiatric interview revealed that several members of her family had been divorced, and that she was married to a man who had once been divorced. Five years previously her sister had died in childbirth and it was at that time that her fear of pregnancy began. After two interviews her anxiety was relieved, she was happier and was grateful to the therapist. She also remarked that she had been making frequent minor errors in her work, which she no longer did as she could now apply herself wholeheartedly to her work.

TABLE VI

Classification of Thirty-One Female Employees According to the Presence or Absence of Personality Disturbance

Classification	#	%
"Normal"	20	65
Mild	6	19
Moderately severe	3	10
Severe	2	6
Total	31	100

3. Employees Requesting Transfer to Other Positions or Leave of Absence

Requests for transfers to other positions and for leaves of absence because of medical complaints are an important and often troublesome problem in large industrial organizations. Should the employee have a physical ailment the physician must decide whether it is a justifiable basis for transfer. Frequently, however, the complaint is found to have no structural basis. Explanation of this fact to the patient is not an adequate remedy. Denial of his request leaves him still unhappy.

In approaching such situations both tact and firmness are required. The employee may be resentful at the refusal to grant his request and impatient of the time spent on the procedure since it takes him away from his work and reduces his income.

Four hundred and seventy persons requesting transfers were studied. Ninety-seven were classified as having severe personality disturbances expressed as physical complaints (see Tables VII, VIII). Detailed interview was attempted in 35 of the cases so as to compare them to persons not receiving treatment. Of the 35 interviewed, some difficulty was encountered in getting adequate information from 7.

None of those who had been told that they had no physical illness and therefore could not be transferred were satisfied with the decision and three-quarters of them either came back to the medical department or went to the personnel department and asked for transfers on other grounds.

Of the thirty-five extensively interviewed twenty-eight were found to have internal conflicts, mainly

TABLE VII

Classification of Persons Requesting Transfer, According to Physical Complaints

Reason for requesting transfer	#
Eye complaints	5
Muscle pain, mainly back, leg or arm	10
"Sinus" complaints	10
Chest complaints	17
Fatigue	12
Gastrointestinal complaints	11
Nervousness, anxiety, restlessness	18
Cardiovascular complaints	5
"Numbness of extremities"	1
Sensitiveness to noise	4
Skin complaints (pruritis)	2
Joint pains	1
Headache	1

TABLE VIII

Classification of Persons Requesting Transfer, According to Psychiatric Diagnosis

Diagnostic categories	#
Anxiety states	86
Conversion hysteria	2
Paranoid states	3
Psychopathic personality	4
Mental defective	2

psychopathology. Three had conflicts arising from life situations and four had physical defects about which they complained excessively. Twenty-six were satisfied with the results of the interviews and were glad to hear that they had no physical illness. They were relieved of their conflicts and have not requested transfers since or were satisfied to wait until they could be transferred for other reasons. The following case history illustrates the successful solution of such a problem.

Case 6. A woman was concerned about her reputation, had headaches and was absent from her work. Psychotherapy relieved her difficulties.

A twenty-two-year-old woman whose friend and fellow worker was arrested because of theft, felt that

the people she was working with were talking about her character. She asked for a transfer. She was transferred to another department where she again felt that people had a bad opinion of her character. If someone passed her without a greeting she thought that this was proof of bad opinion. She wept and complained to her foreman. She had headaches and began to be absent from work. She again asked for a transfer and this time was given a psychiatric interview. After gaining her confidence, her life situation was discussed sympathetically and rapport established. She was reassured and told that she had nothing to be ashamed of and that people forgot about such things rapidly. After this she was satisfied to stay on her job and became friendly with the people with whom she was working.

4. Employees Requesting Therapy.

As a result of successful therapy in the groups mentioned about fifteen requests for psychiatric appraisal and care were received from employees, either personally or through foremen. The complaints of this group were similar in nature to those of employees requesting transfer or leave of absence. Anxiety was the usual symptom. In all cases therapy lessened complaints and abolished absence from work. The following case history is illustrative.

Case 7. A young man who had been a good worker complained about light and noise during his wife's pregnancy. Therapy relieved his symptoms.

A thirty-five-year-old man who was one of the best mechanics in his section was sent for therapy because he complained that the noise bothered him and the light irritated his eyes. He also complained of palpitation of the heart, excessive perspiration, and stomach distress. He had been working in the same department for two years, and had had no previous difficulty. It became evident during psychiatric interview that he had always been anxious and worrisome. His wife was seven months pregnant and he had been worrying that she might die in childbirth in spite of the fact that according to physical examination his wife was healthy. She had no such worries. He was reassured and referred for further interviews to a psychiatrist whom he visited five times at weekly intervals. He gained insight into his day to day reactions to stress and the origin of his personality and psychosomatic disturbance. He worried less about his wife and lost his sensitivity to noise and light.

Reliability of Cornell Selectee Index and Cornell Word Form in an Industrial Situation

The Cornell Selectee Index was given to 279 subjects in this study. This figure includes both veterans and individuals with no military experience. Of these, 213 were classified as "normal" or having insignificant personality disturbances on the basis of Index score, while 66 were classified as having moderately severe or severe disturbances. The following table summarizes the relationship between the Index scores and the clinical classification. The scoring level used fifteen significant answers or one "stop question" as criteria.

It will be seen that the Index detected 73% of those with moderately severe and severe personality disturbances and 8% of ostensibly healthy persons.

TABLE IX

Comparison of Index Score to Psychiatric Diagnosis of Persons Requesting Transfer

	Psychiatric diagnosis			
	Normal and mild		Moderately severe and severe	
Index Score	#	%	#	%
1-14	195	92	18	27
15 and above or one "stop question"	16	8	50	73
Total	211		68	

TABLE X

Comparison of Word Form Score to Psychiatric Diagnosis of Persons Requesting Transfer

	Psychiatric diagnosis			
	Normal and mild		Moderately severe and severe	
Word Form Score	#	%	#	%
1-4	211	73	37	39
5 and over	81	27	57	61
Total	292		94	

The Cornell Word Form was given to 386 subjects. This figure includes both veterans and individuals who have never seen military service. Of these, 248 were classified as having no significant personality disturbances on the basis of Word Form score, while 138 were classified as having moderately severe or severe personality disturbances. The following table summarizes the relationship between Word Form scores and clinical classifications. The scoring level was five significant responses.

It will be seen that 61% of those with moderately severe and severe personality disturbances were detected on the basis of Word Form score while 27% of those without significant disturbances were found to have failing scores.

Thus, it can be said that both the Cornell Selectee

Index and the Cornell Word Form differentiated significantly between individuals with moderately severe or severe personality disturbances and those without such disturbances as revealed by psychiatric interview.

These procedures can be used in one of the following ways: 1) All persons may be interviewed and also complete the two forms. In this case the interviewer may use the scores achieved as pointing out those with personality disturbances, and the individual responses as guides in his interview. 2) If he has not time to interview all persons he may interview only those with poor scores.

The Cornell Word Form may be used in any of the situations described in this paper. The Cornell Selectee Index may not be reliable if used at the time of application for work since there is the possibility that complaints may be denied for fear of not being employed. After the applicant is assured of work this form may be used in placing him or her in any of the other situations described, where it has been shown to be an effective instrument. The Index does not detect all individuals with personality disturbance and it should be emphasized that under no circumstances should the Index score be used as the only criterion in evaluating individuals. It should be used only as an adjunct to interview.

DISCUSSION

The procedures described above are practicable and useful in the following situations:

1) They are valuable in placing industrial personnel in positions which make possible the fullest use of their capabilities while reducing to a minimum the possibility that personality disturbances will be elicited or fostered.

2) When such situations do arise the machinery for combating them is ready with counsel and therapy. Efficiency and satisfaction of employees can be maintained by making available to them help with their emotional problems. Experimental evidence to this effect will be found in a study done at the Hawthorne works of the Western Electric Company (3, 7). It was found that the production capacity of 15 superior workers as measured over a period of several years, rose parallel with improvement of morale and the possibility of discussing with a sympathetic listener the stresses of their daily existence. In addition it was found that in some of the superior workers, the performance rose or fell in relation to their reactions to life stresses outside of the plant. For instance, the efficiency of one worker with migraine increased and decreased parallel with the presence or absence of difficulty with her mother.

Their use in a third situation, i.e., determination of the employability of the applicant for work (as against placement or management of those already employed), requires caution and tact. It is generally acknowledged that persons with serious psychopathology may be not only employable but superior workers. Although in this experiment no difficulties were encountered it is conceivable that resentment may be engendered unless the procedures are carried out with great understanding.

SUMMARY

1) Lowered working efficiency, absenteeism, high accident rate, and grievances may result from conflicts among workers superior, equal or inferior in the industrial scale and from stresses such as pressure of production.

2) A method, using psychiatric interviews and the Cornell Selectee Index and Cornell Word Form, was instituted at the Caterpillar Tractor Co. to insure proper placement and to maintain the mental health of employees.

3) Seven hundred and fourteen employees were interviewed by a psychiatrist; 415 completed, in addition, either the Cornell Selectee Index or the Cornell Word Form; 350 completed both. Veterans and personnel having no military experience were studied separately.

4) Of 508 veterans applying for employment 15% were found to have moderately severe or severe personality disturbances. These men were at first given work which did not involve heavy machinery or continuous pressure for production, while those without personality disturbances were fitted immediately into the production routine. Twenty-three per cent of veterans with personality disturbance at the time of employment were referred for psychiatric care; whereas 4% of those considered "normal" were referred. Such care was indicated because of poor work adjustment and complaints such as anxiety, depression or headaches. As a result of the selective placement and psychotherapy the percentage of those with and without personality disturbance still working, were almost the same.

5) Two hundred and seven persons without military experience were examined to determine the effectiveness of psychiatric appraisal and care in other aspects of the industrial situation. These were grouped as follows:

a) Persons applying for employment, including those formerly employed.

b) Persons already employed, in order to discover the incidence of personality disturbance and the

effect of therapy with a view toward instituting periodic psychiatric examinations.

c) Employees requesting transfers to other positions.

d) A group of employees who recognized the origin of their difficulties in working and requested therapy.

6) Of the small series of employees without military experience who had personality disturbances and received psychotherapy, the large majority were benefited.

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NOTICE

The following notice has been sent to the members of the New York County Medical Society:

Your Committee on Psychosomatic Medicine invites your comments and suggestions on a contemplated program for the coming year. Will you please complete the enclosed questionnaire and return it to this Committee at 2 East 103rd Street, New York 29.

Name and Address:

General Practice and Specialty:

Would you be interested in participating in a program to consider "Emotional Problems in Relation to Practice" (in your own field)?

Which of the following would you prefer:

Lecture Series?

Seminars with presentation of case material and audience participation? Or both?

General Suggestions.

The American Society for Research in Psychosomatic Problems is working in close cooperation with this committee and would welcome comments from our subscribers in the New York area.

THE RELATION OF PEDIATRIC PREVENTIVE MEDICINE TO MENTAL HYGIENE*

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It is becoming more and more evident that preventive medical programs for children cannot be complete without taking into consideration emotional values, for no amount of excellent physical health can be useful without emotional stability. Yet, the relationship between physical development and that of emotional stability has not been simply and clearly defined. Since the fusing of these two goals is one of the main efforts in the Rochester Child Health Project, I shall try to outline some of the principles that are involved. In order to understand our approach, it is necessary first to outline the scope of the project.

We have organized our work with three main objectives in mind: first, a therapeutic effort to do the best sort of job possible for all the children of the community under what are rather unusual medical conditions (uniform medical control and excellent co-operation between physicians, nurses, public health officials, social workers and teachers); second, to study, as we go along, the growth and development of these children in order that we may gather useful information for future reference; and, third, to teach our technics as they are developed to medical fellows, pediatricians, health officers, nurses and teachers.

As we planned the job we immediately saw that it would be hopeless to try to apply the sort of technics we had in mind to children of all ages at once; therefore, we decided to begin with the 1944 crop of babies and to proceed with this group, trying to set the environmental stage ahead of them as favorably as possible. Even this is not, strictly speaking, possible, for much of the information we expected to gain about future children could not be gathered together for this first group. Their histories will be incomplete and the technics we are learning to apply will not all be of benefit to them.

Since the growth span covers many years during which the needs for the children vary widely, it seemed advisable to divide it up into five different periods; namely, the prenatal, neonatal, infant, preschool and school.

In the prenatal period, we will be interested not only in the provision of the best sort of obstetric care for the mothers, including prevention of disease, adequate diets and so forth, but also in preparing the parents of our prospective candidates in the essentials of child care, the advisability of breast feeding for physical and emotional reasons, and in teaching them something about what human beings are like, especially in their early years.

In the neonatal period, the most dangerous one in terms of mortality rates, we shall try to organize the safest and healthiest sort of nursery life possible. It may be that we eventually will develop a plan quite different from that usually employed nowadays in nurseries for newly born infants, but we will have in mind both physical safety and a satisfying emotional background in our eventual type of care.

In the period of infancy (the first two years), we will maintain our contacts with the parents and children through well baby clinics (free and pay). The children will attend at monthly intervals the first year and about five times in the second. Here we will be interested in the treatment of obvious defects, the elimination of deficiency diseases, preventive inoculations and the establishment of a useful set of habits of living.

In the preschool years (two to six), we face a difficult problem which has not yet been solved anywhere, that is, how to keep track of children at this age. We anticipate that we can increase attendance at preschool clinics by close contact with mothers in the earlier years, and by establishing for some of the children a nursery school program which will act as a center for the education of the parents of all of our children of this age. We do not consider that it is necessary or advisable for all preschool children to attend nursery schools but we do think that such schools have a definite educational value in the community, that they are helpful to selected children and that they provide a useful source of information about growth and development.

During the school years we will be interested in continuing preventive medical efforts and also in the type of education our children receive. An educational system which realizes the importance of growth and development in the learning process would supplement our efforts. The school board, superintendent and many of the teachers are already interested in the far reaching implications which normal growth and development may have on education.

* Read at the meeting of the Minnesota Society of Neurology and Psychiatry, Rochester, Minnesota, May 5, 1945.

In all of these five categories, punch card records will be kept. These have been tentatively made out for the first three.

I have outlined very briefly what we intend to do. What does this imply from the standpoint of emotional development? In the first place, many thoughtful pediatricians have been given a most challenging jolt by the general acceptance of the idea that adult psychiatric abnormalities may have their origin in emotional experiences outside the field of actual memory, and by the suggestion that many obscure causes of such difficulties may hark back to childhood emotional lesions. Since the first few years of life are, for the most part, hidden from memory and since pediatricians are responsible for the accepted technics in managing these years, we have certainly been put on the spot. The mental and emotional instability of the last few generations is certainly not a recommendation for our care. The Army and Navy statistics, in fact, form a definite indictment. In a sense, we are rising to that indictment to see if a better job cannot be done with the knowledge we now have at hand.

Emotional disturbances in childhood probably have the same basis as those in adults; that is, inconsistencies and clashes between the natural drives of the human organism and the demands of the environment. In adults, the force of natural drives comes up against the restraint of rigid rules of conduct and causes various sorts of emotional disturbances. In children, exactly the same sort of experiences occur except that the causes are more easy to see and the emotional results have been more or less taken for granted. We assume that it is normal for an infant or young child to indulge in vociferous display of emotions.

If it is true that what happens in early life is of later significance from a psychiatric standpoint, one of the most reasonable things to attempt would be to decrease these early difficulties. I shall try to show that this can be done to a large extent without changing the mores of civilization too radically.

We propose to begin at the beginning to apply the principles of mental hygiene; therefore, we have immediately become interested in the emotional stresses of the newly born baby. In fact, we feel that at no time in life do all human beings suffer as severe an emotional shock as they do at birth. Not only is the delivery itself a traumatizing process, involving a very tight squeeze and often much hauling and pulling by head, arms and legs; but the sharp change in physical environment occurring at birth is evidently a frightening experience to the baby. Before birth he is kept secure in a dark, quiet, warm, wet environment, which is in frequent rhythmic motion as the mother moves about and which demands little of him in the way of effort to survive. After delivery, the baby is suddenly thrown into a bright, noisy, colder, dry world in which there is little rhythmic motion and in which he must of necessity exert himself to live. Breathing, eating and eliminative functions become imperative activities in his life.

Since the newly born child is equipped with a whole gamut of automatic reflexes which call forth violent episodes of crying (emotional behavior) whenever anything threatens his survival or the normal processes of development, it is not surprising that a considerable portion of his early days is spent in crying. Some of the causes for this emotional reaction are the changes in environment mentioned previously, sudden movements associated with loss of equilibrium, loud noises, application of outside force of any sort and interference with the normal rhythm of the nursing reflexes.

We have begun to study neonatal crying with the idea that by removing some of these causes we may be able to ameliorate the apparently unhappy state of newly born babies. In preliminary work (1) we were able to show that in our nursery the average baby cried about two hours daily, certainly more than should be necessary to make attendants aware of his needs. It was also quite evident that individual nursing care tended to decrease the display of emotion.

We propose, as time goes on, to devise a more comfortable setup for children of this age, who are at the most precarious period of human life, although we do not yet know what the change may entail. It quite possibly may mean keeping the babies in closer contact with their mothers, giving them much more attention, even a hark back to rocking chairs or rocking cradles!

We intend to follow up this ameliorating regimen in the hospital with an attempt to have mothers give their babies a more responsive sort of nurture at home during the first few months. To that end we advise them to react in a motherly way to their babies' distress signals, to feed them when hungry, to change the diapers when the babies cry because of wetness or soiling, even to pick them up and fondle them when they cry for reasons beyond our ken. After nearly thirty years of experience with children I am convinced that this will not spoil babies, that it relieves their distress and that this is the way they are supposed to be treated.

It should be mentioned also at this time that neonatal, compulsive, reflex crying does not persist all through infancy. It disappears by normal processes of development before two or three months of age. That is why infants of three to nine months are quite reasonable in their demands as compared to those in the

neonatal period. This is a point in emotional development which has been largely ignored in books dealing with child care.

After the neonatal period, the causes of emotional display in young children can be grouped into four main categories; namely, those pertaining to eating, sleeping, eliminating, and growth of neuromuscular abilities. This is why a good working knowledge of growth and development becomes imperative for anyone supervising child care. It is clear to any student that all of these functions develop normally through innate mechanisms which, if paralleled by our efforts, will proceed smoothly and which, if crossed up by poor timing or directions, will result in disturbed function and, what is more important, in a long sequence of emotional upsets. I shall try to illustrate this thesis briefly in order to show how we are attempting to lessen emotional stress in early childhood.

Perhaps the most numerous points of stress are associated with eating. In the normal development of eating habits we have come to recognize that a baby is equipped with a rhythm of mealtime demand and a mechanism which governs both the amount and the choice of foods. One can easily understand then why young children who are placed on rigid dietary schedules which ignore these innate controls, as to feeding time, and amount and variety of foods may experience many difficulties. For instance, the child with a three hour rhythm will have several emotional crises a day when put on a four hour schedule, because he is denied food when naturally hungry and has it urged on him when he is not ready for it. Likewise, if the prescribed formula is insufficient for his innate demand, he will scream for more, or, if he is urged to take more than his internal needs ordain, he will protest with all his emotional force. Later on, when considerable variety is introduced in his diet, unaccountable differences of taste may occur, which need to be respected in individual children. Failure to recognize the validity of these individual differences may lead to many storms at mealtime.

In the realm of sleep, similar difficulties arise. In very young infants, because of the sleep, eat, sleep, eat sequence, sleeping problems are closely allied to those arising out of the rhythm of eating. Later on, when other activities take up more of a child's time, rigidly applied sleep schedules are responsible for many hours of screaming protest, as mothers try to make wide-eyed youngsters subside. The assumption of normal sleep habits will depend on providing children with a quiet restful environment when they show the need for it.

In the eliminative field, modern attempts at premature training in both bowel and bladder control produce not only violent emotional displays but also serious functional disturbances in the baby. Here the fault lies in an attempt to force mature behavior on a baby before his brain is ready for it. Confusion and lack of understanding result in an unhappiness which often lasts over all the years of childhood.

The most critical period in which the neuromuscular progress of a child gets him into emotional jams is during the second year of life. At this time, owing to his rapidly developing abilities in locomotion and in handling objects, his growth demands the exercise of each newly acquired skill. One finds him poking about, investigating and prying into every detail of his physical environment. In the average situation this is neither safe nor desirable. One cannot allow him complete freedom to exercise his skills unless the environment is changed to fit his propensities. Dangerous articles have to be removed and valuable ones put beyond his reach. Unless this is done, mothers have to follow their babies about with an almost continuous barrage of "no, noes" from morning to night. In such instances, it is common to find babies resisting adult prohibitions with all their strength many times a day.

It must be evident by now that I am not talking about the elimination of occasional emotional insults in children but am speaking of the avoidance in each child of hundreds and thousands of such episodes, for they involve acts repeated many times a day throughout childhood. The sum total of the lesions, then, may be of major psychiatric importance.

Up until now, I have spoken of the negative side of the picture, of the avoidance or elimination of emotional trauma. On the other hand, this attempt to supplement normal growth with sympathetic child-care technic has an equally important positive value which I shall mention only in passing. It is through parents' co-operative efforts with the child's development that they can best help an infant to function successfully, thus building up in him a sense of his own competency and of his confidence in the backing of his elders. This comes close to fostering the kind of basic security which all students of human personality have emphasized as very necessary.

I fully realize that from a psychiatric viewpoint this effort may appear extremely superficial, seeming to ignore such accepted factors as the mother's attitude to her baby and the various complexes ascribed to early childhood existence; however, I am advocating attention to these superficial details in the babies' direct management as an obvious shortcut in child care at a time in our history when it is impossible to treat

adequately the parents and attendants of all our children. Moreover, the method itself may, I believe, have some effect in changing parental attitudes favorably.

From the standpoint of the emotional development of children then, we are trying to find the answer to the following questions: 1. Can healthful pediatric technics to eliminate many sources of emotional stress be devised on a mass scale? 2. What effect will this have on the personality of children?

I feel that this effort is logical, subject to scientific study and of vital importance to democratic living. I hope I have not oversimplified the problems, but I do feel that they are being made more complicated now than is necessary because most of the effort is being expended at the school and adolescent ages rather than at the beginning of life.

REFERENCE

1. Aldrich, C. A., Sung, Chieh, Knop, Catharine, Stevens, Geraldine, and Burchell, Margaret: The crying of newly born babies. I. The community phase. J. Pediat., **26**:313, 1945.

EIGHTH SERVICE COMMAND POSTGRADUATE MEDICAL EDUCATION

Neuropsychiatric Case Report

case no. 13—august 1944

chief complaint and present illness

A 26-year-old Jewish technician fifth grade, with fourteen months' service, was admitted to the Medical Service April 19, 1944 because of intolerable generalized headaches, left chest pain, inability to sleep, and general malaise of nine months' duration.

The headaches were bilateral and predominantly frontal, beginning in the morning and gradually becoming worse during the day. They involved the whole head until he became confused and unable to do anything, and wanted to get away by himself. The patient stated, "I can hardly eat, and when the headache really gets bad I can hardly move because of the severe, intolerable pain, and I become weak and dizzy." The headache had gradually become worse since onset several months before, and at the time of admission to the hospital he felt so badly that he couldn't walk to the laboratory for routine tests, even though the laboratory was very close to the ward. The weakness was generalized with no specific localization. There was no nausea, vomiting, or any evidence of sinus infection.

Review of symptoms revealed intermittent sharp, stabbing pains in the precordial region which occurred with exertion or at rest. There was no dyspnea or dependent edema and the pains were not accompanied by apprehension.

In addition to somatic complaints the patient complained of confusion, inability to concentrate, "subjective nervousness," and insomnia. He attributed all symptoms to visual defects which had been present practically all his life and which were properly corrected by glasses.

personal history

The patient's birth and early development were normal. There were no temper tantrums, enuresis, somnambulism, or other neurotic traits. As an adolescent he was abnormally shy, especially with members of the opposite sex, was afraid of the dark, and was never allowed to compete in athletics.

The patient was closely attached to his mother, who dominated the family. She suffered from severe headaches, especially when under stress. There were four siblings. Except for the dominance of the mother and mild financial difficulties, the home life was stable until the patient was 10 years of age, though he was overprotected by the mother. He stated that he was the favorite of his mother and, in order to preclude any possible injury, the usual childhood activities were somewhat limited. For the next two years the home life was unstable as his father became irritable, confused, and frequently acted "queer," beating his children, throwing dishes, and the like. The children would creep to bed during these episodes. This behavior progressed to such an extent that it became necessary to place the father in a mental institution when the patient was 12 years of age. This became a subject which could not be discussed with the family, especially outside of the home. Prior to this the father had been a good-natured man, who worked hard and had high ambitions for his children but was frequently away from home. The patient was never very well acquainted with his father and soon lost contact with him. Only a few years before he had learned that his father had died in the institution. After his father's hospitalization his mother became more reserved and worked hard. There was a constant struggle to live at previous standards because of marked financial difficulties. It became necessary for the patient to work after school and during the summer months. His mother gradually became more dominant, controlling their lives completely. She constantly urged the children to get a good education in order that life would not always be a struggle. Her headaches became more frequent, especially when the children did not conform to her desires. Thus she was able to control any deviation of behavior which did not meet with her approval. Until his marriage the patient was allowed to retain only seven dollars per week of his salary for incidental expenses, even though he was 23 years old and was the prime support of the family.

The patient was an above-average student in school, had no disciplinary problems and attended regularly. He was able to obtain a college degree in business administration by working and attending night classes. He had attended night

law school for one and one-half years prior to induction. He had never had time for the usual social activities or very little other activities than work.

His first heterosexual relations occurred at twenty years of age and continued occasionally until his marriage about one year before induction. Marital relations were satisfactory. There were no problems of masturbation.

His mother violently opposed his marriage. She threatened not to advance the son money, attend the wedding, or give her blessing. After much hesitation he decided to be married anyway. This was the first time in his life he had opposed his mother. At the time of his induction his wife was pregnant, which resulted in tubal abortion and survery. It was necessary for her to live with her parents, which was very unsatisfactory.

The soldier's work record was good. He was employed by the City of New York in an administrative position for several years. In March 1943 he was inducted into the Army at Fort Dix, New Jersey. He then was transferred to Mississippi, and the headaches began while he was stationed there. He was first utilized in personnel work but was later sent to artillery mechanic school, and with this assignment all his symptoms increased. There had been no court martials or A.W.O.L.'s.

PAST HISTORY

The patient had diphtheria at 4 or 5 years of age and measles at 7 years of age, with no sequelae in either case. There were no other illnesses or operations, and except for general nervousness he had no complaints until onset of the present illness.

EXAMINATIONS

Physical examinations, including complete neurological examination, were negative except for vision of O.D. 20/300 corrected to 20/25, O.S. 20/300 corrected to 20/25, and mild internal hemorrhoids. The visual fields were somewhat constricted on first examination, but these findings were not consistent. Laboratory examinations were entirely normal: x-ray of skull; repeated visual field examinations; ophthalmoscopic examination; non-protein nitrogen, fasting blood sugar, and glucose tolerance tests; routine Kahn test; urinalysis; and cerebrospinal fluid examination.

On admission the soldier was somewhat confused and mildly depressed. He showed very little interest in the usual ward activities and preferred to remain in bed. He was able to sleep but little and his prime concern was his somatic symptoms. He was uncooperative and had no insight into his illness. He had difficulty in adjusting to ward activities but slowly improved.

RESULTS AND DISCUSSION

This patient was admitted to the hospital because he was unable to perform even the simplest of duties. The ward officer was very much interested in psychosomatic medicine and recognized that this was an emotional illness. During his course in the hospital somatic complaints were minimized, he was reassured, and the psychogenic factors were explained, while at the same time all possible etiological agents were investigated. He was given palliative therapy and sedation on the ward and physical activity was encouraged, but at the time of transfer to the reconditioning unit he had not been able to cooperate satisfactorily in the in-hospital reconditioning program. However, it was believed by the neuropsychiatrist and the ward officer that prolonged hospitalization was contraindicated. All symptoms were intensified by transfer to Annex No. 1, and the patient was very resistant to any attempts at therapy. However, with daily interviews sufficient rapport was established; and as the emotional life of the patient was gradually portrayed to him, he began to develop insight and gradually improved until he was able to perform all duties at Annex No. 1 (including hikes, drill, calisthenics, and kitchen police duty) without any symptoms. He became anxious to return to his organization for duty. For two months he was followed in his organization, where he performed all duties well, and his commanding officer stated that he was a very efficient soldier.

This soldier was a very neurotic individual who had adjusted well to civilian life with only mild to moderate tension symptoms under stress, and who was able to perform his first few months of service satisfactorily until the stress in his environment became more than he could tolerate. He reacted to this added stress by symptom formation, especially headache; and as stress became marked, confusion and depression developed. It is felt that this individual was predisposed to his neurotic manifestations by the change in his home environment when he was around 10 years of age. At that time a fairly stable life became an unstable one in which his life was dominated by an ambitious, neurotic mother who did not permit any expression of hostility toward her and who reacted to stress in her environment with severe headaches. It became necessary, since he was the oldest child, that he assume in certain respects the function of a father. Later he succeeded in transferring his emotional dependence from his mother to his wife, to whom he was very much devoted. It is interesting to note that he adjusted well in the Army so long as he was utilized in a clerical capacity; but when he was transferred to mechanic work, in which he did not excel and which he disliked, somatic symptoms appeared. At this time his security was further threatened by possible loss of his wife from an illness which he felt he had caused (pregnancy), and his neurotic symptoms were therefore markedly accentuated. While he was at home on furlough during his wife's illness, these symptoms were enhanced by his mother's assertion that he was acting exactly like his father did before he "went crazy." In addition to the above precipitating factors in his personal life, the morale of his organization was low, and he was frequently subjected to abusive remarks because of his Jewish ancestry, such as "dirty hebe" and the like. These various precipitating factors occurred almost simultaneously. Also, on his return to duty from furlough he found that his organization had been alerted. This so accentuated his symptoms that admission to the hospital became necessary.

This patient was considered capable of rendering valuable service to the Army. In the beginning very little was demanded of him at the annex, but as he gradually improved

his activities were increased. In addition to the psychotherapy it is felt that the orientation lectures, with emphasis on the importance of each soldier to the Army as well as general reorientation as to the Army and its functions, helped this patient to develop better attitudes. It is our belief that reconditioning units furnish an ideal situation for evaluation and treatment of neurotics, as the environment is somewhat similar to that to which they will return when discharged to duty. We realize that in certain individuals this may make therapy more difficult but it is our opinion that these patients should be observed and treated in a situation which is equivalent to regular duty. It also serves as an excellent method for determining what disposition is best for doubtful patients. It is felt that this patient will now render efficient service in the Army, although two months is not an adequate followup period.

(Diagnosis: Psychoneurosis, mild, with psychosomatic symptoms referrable to the central nervous system.)

DISCUSSION

Colonel Franklin G. Ebaugh: This brief case abstract brings out many practical facts that should be utilized for more prompt restoration to duty of soldiers who present psychosomatic complaints. These facts can be summarized as follows:

1. The avoidance of elective hospitalization in the majority of cases and of prolonged hospitalization in all cases presenting psychosomatic complaints.

2. The importance of the early completion of all indicated examinations to rule out physical disorders as well as to obtain facts that relate symptom formation to situational stresses and emotional conflicts.

3. The institution of effective therapy away from the hospital such as is provided by the hospital annex reconditioning program. Here participation in the activities of the group, including continued military responsibilities and group and individual psychotherapy, is indicated.

Elective hospitalization is avoided in most cases through the development of good unit morale, and accurate evaluation of psychosomatic complaints when seen at sick call, especially headache, insomnia, anorexia, trembling, sweating, confusion, and symptoms referrable to the gastrointestinal, cardiovascular ,and musculoskeletal systems. Complete physical examination with negative findings is reassuring in itself and will take care of most cases of transient situational stress. The statement "There is nothing wrong with you" should be qualified by explaining that the condition is a temporary one due to tension and worry. These patients need to be given emotional security, support, and respect by all medical officers instead of encountering hard-boiled attitudes with insinuations of goldbricking. Such attitudes always aggravate the complaints and fix the symptoms.

It is pleasing to note that in this case prolonged hospitalization was avoided and that this soldier had the benefit of complete physical studies as well as an appraisal of his personality background and makeup and their rôle in symptom formation. We see the important rôle played by this patient's general background, relations with his parents, identification with his neurotic mother, and emancipation difficulties, which were partially relieved when he married. There was a general relighting of his neurotic symptoms in the Army, precipitated by a change in assignment from clerical work to artillery machanic school. These symptoms became more acute following a furlough at home, necessited by his wife's illness. His feeling of responsibility for the illness and his mother's suggestion regarding his having a mental illness just like his father's caused additional tension and anxiety, expressed in his complaints of headaches and confusion.

In the hospital annex daily interviews with the medical officer provided adequate reassurance and opportunity for review of life situations and the military adjustment. He was kept active during his short stay in the hospital and received continued treatment after being transferred to the reconditioning hospital annex section. Here fundamental brief psychotherapy should be given on the basis of the following general principles:

1. Review of life experiences, especially for psychological ventilation of emotionally charged memories, relationships to parents, resentments, etc.

2. Development of individual security and sense of "belongingness."

3. Restoration of the individual as a useful member of the military organization.

It is gratifying to note that this study was made by a psychiatrically oriented officer trained in surgery.

AMERICAN SOCIETY FOR RESEARCH IN PSYCHOSOMATIC PROBLEMS

Report of Activities

Research Activities

Project on Diabetes in Children, sponsored by the Committee on Social and Cultural Problems: In the last year, a study of diabetes in children has been made under the direction of Dr. Hilde Bruch at the Pediatric Department of the Vanderbilt Clinic in New York. Twenty diabetic children have been followed in the clinic from November 1944 to the present time. The mothers and patients were interviewed at each visit to the diabetic clinic by a psychiatric social worker.

A great deal of material has been compiled on family attitudes toward the diabetic child, his disease and its treatment. These attitudes seem to have importance both for the management of the disease and for the course of the child's personality development. A preliminary report on "Psychiatric Aspects of the Medical

Management of Diabetic Children" is in preparation. Future papers dealing with the relationship of the diabetes to personality and to cultural background are planned.

Project on Primipara in a Pre-Natal Clinic, sponsored by a Subcommittee of the Committee on Obstetrics and Gynecology: A study is being made in the pre-natal clinic of the Long Island College Hospital in Brooklyn for the purpose of obtaining psychological material on the period of pregnancy and the post-partum period, and of correlating this material with the physiological data in the medical record and additional physiological data to be obtained as a part of the procedure of the study. The study is being made by a psychiatric social worker under the supervision of Dr. Howard Potter, Chief of Psychiatry at the hospital, and the medical doctor in charge of the pre-natal clinic. Its purpose is to gather psychological material in areas which have been outlined by the subcommittee, in order to learn what needs more detailed investigation. An immediate result of the study should be to indicate the kind of changes which could be made to improve the care given by clinics to pregnant women.

A report on the results of the study will be written for the practising obstetrician.

Two further projects have also been accepted by the Committee on Psychosomatic Research. The first, on Diabetes in Adolescents, has been submitted by Dr. Jacob Arlow. Its purpose will be to discover in more detail the psychological facts of the adolescent diabetic's life, and correlate these facts with physiological facts connected with the onset and course of the disease. The study will be made by Dr. Arlow and an internist trained in psychosomatic medicine, and a psychiatric social worker. This study will have an especial value in view of the study on diabetes which is already in progress.

The second project, on Psychosomatic Aspects of Tuberculosis in Children, was submitted by Dr. Bret Ratner, the director of Sea View Hospital on Staten Island. It will be sponsored by the Committee on Infancy and Early Childhood. One of the questions such a study may consider is the effect of institutional life on children with a chronic disease.

Conferences

Committee on Cardiovascular Disease, Dr. Edward Weiss, Chairman: This committee will hold a dinner discussion meeting on December 13, 1945. The topic for the meeting is "Techniques of Research with Special Reference to Cardiovascular Disease." It was felt by the Committee that a discussion of this kind is an important preliminary step in clarifying areas and techniques of investigation which may later be utilized in cardiovascular research. In addition, it is expected that such a meeting will serve as a pattern for other research committees which wish to consider techniques of investigation in their respective fields.

Committee on Physiological Mechanisms and Animal Experimentation, Dr. Jules Masserman and Dr. Ralph Gerard, Co-Chairmen: This committee will hold a scientific meeting devoted to the topic "Recent Advances in the Study of Experimental Neuroses," in New York on Friday, December 14, at the New Yorker Hotel. The morning session, beginning at ten o'clock, will be devoted to a report by Dr. D. O. Hebb of his observations at the Yerkes Laboratory, followed by supplementary presentations by Drs. W. Horsley Gantt, Howard Liddell and Jules Masserman. After luncheon, discussion will be continued by a panel representing related experimental and clinical fields, and by the Committee and its guests.

Committee on Cutaneous and Allied Diseases, Dr. John Millet, Chairman: The topic of the conference arranged by this committee is "Disorders of the Respiratory Tract." Dr. Harold G. Wolff will give the main paper. The meeting will be held in January.

In all conferences, it is the policy of the Society to enable those Society members who wish to attend a committee conference, to do so where possible. However, in those cases where conferences have been planned for a small group in order to provide the most favorable opportunity for discussion, the number of invitations will be limited.

Reports of these conferences will either be published in the Journal in abstract form, or issued in full to Society membership upon request.

Membership

During the year 1945, 79 persons have joined the Society. These include representatives from ten medical specialties, the largest group representing pediatrics and internal medicine. Eighteen new members came into the Society after a conference in Detroit which they had attended as guests of the Committee on Infancy and Early Childhood. The Society now has a total membership of 440.

Membership is open to persons who have demonstrated a constructive effort in the psychosomatic field, who are sponsored by two members of the Society. Membership becomes final after favorable action by the Membership Committee. Dues are $12.50 per year and include a subscription to the Journal.

Office Staff

Due to the growth of the journal, PSYCHOSOMATIC MEDICINE, and the attendant increase in

editorial responsibilities, Miss Ruth Potter has resigned as Executive Secretary of the Society, to become Publications Secretary. Her place will be taken by Mrs. Ruth R. Colgrove as General Secretary, and Mrs. Irma Hewlett will continue as Research Secretary. Miss Potter will continue as Managing Editor of the Journal.

Future Plans

The activities of the Society, during the two years of its existence, have necessarily been curtailed by the war. Many of our members have been in active service and those in civilian life have been over-burdened with additional responsibilities.

It now seems possible to expand our program, not only in respect to conferences and research projects, but also in relation to the interest in psychosomatic medicine which has been stimulated by the war experiences of medical officers.

A review is now being made of the contributions which the Society can make to provide research and training opportunities for this group. It will undoubtedly be necessary to raise considerable funds to implement such plans.

ANNUAL MEETING

1946

The program for the Annual Meeting of the American Society for Research in Psychosomatic Problems is now being planned. A two-day meeting has been tentatively scheduled. Persons wishing to present papers will please send title and abstract to the Program Committee, American Society for Research in Psychosomatic Problems, 714 Madison Avenue, New York 21, New York.

REVIEWS OF PERIODICAL LITERATURE

MacKenna, R. M. B., Brigadier, Consulting Dermatologist to the Army: *Psychosomatic Factors in Cutaneous Disease.* Lancet, November, 1944, p. 679.

The author's reason for writing this paper was that he wished to furnish some common ground between psychologists and dermatologists in their approach to cutaneous diseases. So often the dermatologist is satisfied by saying "This case is psychological in origin," without stipulating the type of psychological lesion from which the patient is suffering; whilst psychologists are often not sufficiently informed concerning dermatological conditions to be able to assist the specialist in skin diseases.

The author well recognizes that to publish such a paper in the present state of our knowledge is to invite serious criticism at some future date, but the first steps have always to be taken and he will not be unduly distressed if his present suggestions have to be considerably modified in the light of future experience.

His main thesis is that, from the point of view of the dermatologist, six classes of individual are of particular importance:

1. Personalities of low intelligence
2. Personalities with hysterical features
3. Personalities with obsessional features
4. Personalities with severe anxiety, open or concealed
5. Personalities with obsessional trends
6. Personalities with narcissistic features.

In the author's opinion persons of low intelligence (*i.e.*, having a low inborn capacity to learn) are prone to infestations and to secondary sepsis. Personalities with hysterical features may develop self-inflicted lesions. Narcissists may be prone to exudative dermatoses. Gross states of anxiety may be associated with rosacea, pompholyx, hyperidrosis and excoriated acne. Patients with obsessional trends tend to suffer from lichenification, prurigo simplex, pruritus ani, pruritus vulvae and also if they suffer from any cutaneous disease tend to develop dermatitis medicamentosa from over-treating themselves.

The author therefore suggests that if a patient having a well marked type of personality is about to develop a skin eruption, it is possible to suggest in advance the type of skin lesion which that patient will eventually manifest.

Author's Abstract

Michaels, Joseph J.: *A Psychiatric Adventure in Comparative Pathophysiology of the Infant and Adult, with Some Theoretical Suggestions in Regard to Regression in Somatic Visceral Functions.* J. Nerv. and Mental Dis., **100**:49, 1945.

Some broad general principles of pragmatic value in psychobiology are discussed in a most interesting manner. The hypothesis that the somatic visceral expression of psychosomatic disorders resemble the physiological states of infancy, either as an exaggeration or an accentuation, is presented. The startle state and its relationship to anxiety with the basic feature of the physiological and psychological separation of the infant from its mother are discussed. The high degree of the homeostatic lability, variability and inconstancy of adaptation of the newborn is described. It is suggested that the choice of the organ or organ system in the formation of an organ neurosis may be dependent upon its fusion with an emotional process at a labile period when the organ had not yet attained its full maturation. Specific examples of the similarity of the somatic visceral expressions of the psychosomatic disorder in an adult and the physiological state of infancy are described. (M. G.)

Rowntree, Leonard G., McGill, Kenneth H., and Hellman, Louis P.: *Mental and Personality Disorders in Selective Service Registrants.* J. A. M. A., **128**:1084, 1945.

A review of prevalence and rejections for mental disorders among Selective Service registrants shows that:

The majority of rejections for mental and personality disorders were made by armed forces' psychiatrists; these rejections were made on a basis of unfitness for military life, although not all the disorders were handicapping in civilian life.

Mental and personality disorders were the principal cause for rejection of 801,700, or approximately 17.8 per cent of registrants aged 18-37 in rejected classes on Jan. 1, 1945.

The rejection rate for this type of disorder increased from 22.3 per thousand examined in peacetime to 120.2 per thousand examined in 1944.

The rise in rejection rate was not due solely to increased nervous tension among examined registrants. Other factors to be considered are changes in examining procedure, lowering of standards in other defect categories and stricter interpretation of standards for mental and personality disorders by the armed forces' psychiatrists.

Relatively more white registrants than negroes have been rejected for mental and personality disorders.

Psychoneurotic disorders and psychopathic personality account for more than 8 out of every 10 rejections for mental and personality disorders.

Psychopathic personality is more prevalent among negroes than among white registrants, while the reverse is true for psychoneurosis.

With increasing age, relatively more registrants are rejected for psychoneurotic disorders.

Among 18-year-olds more than one-fifth of the rejections for mental and personality disorders are due to emotional immaturity.

Of those gainfully employed, the psychoneurosis rejection rate was highest for professional and managerial workers and lowest for farm laborers, while the rate for other mental and personality disorders (consisting mainly of emotional instability and asocial and amoral trends) was lowest for the former and highest for the latter. (F. V. L.)

RANDALL, GUY C., EWALT, JACK R., AND BLAIR, HARRY: *Psychiatric Reaction to Amputation.* J. A. M. A., **128**:645, 1945.

The reaction to the loss of one or more limbs was studied in 100 soldiers who were considered normal. Seventy-six of these men were injured in battle and 24 in accidents.

Lower limb amputations predominated.

The average age of these patients was 26.7 years.

They were all well trained and experienced soldiers.

In general those with upper extremity injuries, married men and older men had less trouble in social adjustment to amputation.

More than 50 per cent planned some change in occupation as a result of the injury. The planned changes were more common in younger troops and in troops with lower extremity loss.

There was considerable difficulty in sexual adjustment. This phase of the problem is to be investigated further.

Signs of psychopathology in terms of personality change, anxiety, emotional instability, battle dreams and alcoholism occurred in a surprising percentage of these men.

Phantom sensations of some type occurred in 95 per cent of these patients.

An increased religious feeling was common in the two groups of patients but is more frequent in the battle casualties (38 per cent) than in the nonbattle casualties (20 per cent).

A history of previous accident was not common in these cases. (F. V. L.)

LEWINSKI, ROBERT J.: *The Psychometric Pattern: II. Migraine.* Psychiat. Q., **19**:368, 1945.

Twenty-five white males, ranging in age from 17 to 33 with an average chronological age of 19.6 years were tested by the complete Wechsler-Bellevue Adult Intelligence Scale in conjunction with neuropsychiatric examination. Each was examined by at least 2 psychiatrists, and the resulting diagnosis of migraine headache met with general agreement.

Data obtained from the test results were analysed with a view toward determining specific abilities or disabilities on the various subtests and discovering consistencies of function.

This was accomplished by considering 1) the number of patients deviating whether positively or negatively on each subtest from their mean weighted scores on all subtests and 2) the magnitude of the median of these deviations. When the rank order performance of the migrainous patients on the various subtests was correlated with that of normal subjects the coefficient was found to be rho=plus .536, P.E.=.16. This is larger than that found to exist between neurotics and normals, but smaller than that obtained when the performances of neurotics and migrainous patients are correlated.

The best performance of the migrainous patients was evidenced on tests involving visual motor coordination, perceptual discrimination, synthetic and analytic ability, and ability to differentiate essential from nonessential details. Their relatively good performance on the Object Assembly Test and relatively poor performance on the Picture Arrangement Test were found to be of interest from a clinical standpoint when compared with the observations of other investigators. (F. V. L.)

ARBUSE, DAVID I.: *Neuropsychiatric Manifestations in Malaria.* U. S. Naval Med. Bull., **45**:304, 1945.

Malaria as a cause of temporary mental disturbance, or as a causative or precipitating agent in mental diseases, presupposes a previous finding of malarial parasites in the peripheral blood, or a history of recent recurrent attacks of malaria. It is acknowledged that patients suffering from malaria may manifest psychic symptoms which antedated the disease, and that they may also have a superimposed psychoneurosis or a functional psychosis. The rapid response and improvement in the mental symptoms with antimalarial therapy would indicate a direct causal relationship in many cases.

Routine psychiatric examinations and a keener cognizance of the possibility of concomitant psychologic alteration may disclose more cases and lead to a better understanding of this problem.

Malarial infection of the central or peripheral nervous system may simulate many well recognized organic

and functional conditions. The neural involvement shows great variability and may range from cranial to peripheral nerve impairment. Although the mental symptoms are not usually prominent, they may be of wide variety. (F. V. L.)

SKVORTSOV, K. A.: *Treatment of Hysterical Deaf-Mutism with Ether Anesthesia.* Sovetskaya meditsina, 2:11,1943. (Courtesy, Am. Rev. Sov. Med., 2: 542, 1945, J. S. Kasanin.)

Hysterical deaf-mutism has been common in World War II as in World War I. Therapeutically, ether was first used by Hutchinson, an American Army surgeon, in the Civil War. The author emphasizes the slow administration of the anesthesia and concomitant use of suggestion. Usually the patient struggles a good deal during the first phase and begins to talk. On awakening, the patient is able to talk and remembers talking under anesthesia. The author does not state the number of cases treated. He cites three cases. In the first two, the condition was entirely functional and the patients were cured. The third case was that of a schizophrenic stupor and in which the anesthesia was of no avail. (F. V. L.)

OWEN, TREVOR: *The Medical View of the Menopause.* Am. J. Psychiat., 101:756, 1945.

The menopause is a series of regressions in those functions of growth and maturation which appeared at puberty and are now in a certain way reversing themselves. When problems do arise it is because the new changes are not moulding themselves harmoniously and evenly. The normal menopause like normal puberty is evolutionary but the abnormal menopause is revolutionary, until the many facets of the new biochemistry settle themselves into that new compromise governmental arrangement which is the altered person. We need to know and be able to measure and record simultaneously all the various stimuli and hormones coming from and going to the hypothalamic region.

Until we can do this and have potent substances to use we cannot expect to make good the deficiencies or to suppress or counterbalance the excesses of deteriorating irritable tissues in order to relieve discomforts which go with them.

These are early days in endocrinology. And so the most important treatment to follow as in many other uncomfortable episodes of living is psychotherapy. (F. V. L.)

BOOK REVIEWS

BINGER, C. A. L., ACKERMAN, N. W., COHN, A. E., SCHROEDER, H. A., AND STEELE, J. M.: *Personality in Arterial Hypertension.* Psychosomatic Medicine Monograph No. 8. New York, American Society for Research in Psychosomatic Problems, Inc., 1945, 227 pp. $3.00. (Distributed by Robert Brunner, 1212 Sixth Ave., N. Y.)

It appears that the time has come for the consideration of new concepts and the development of new technics in the examination of the problem of essential hypertension. This monograph is an attempt in this direction, *i.e.,* an inquiry into disturbance of personality and its possible relationship to elevation of blood pressure. The authors are aware of the need to interpose between the psychic alteration and the appearance of elevated blood pressure, a physiological pathway, disturbances in which could conceivably explain the ultimate perturbation of circulatory dynamics. They have interposed as the physiological pathway, renal ischemia or other associated interference with renal hemodynamics as the necessary precursor to the elaboration of a humoral pressor substance. Their thesis can be summarized in their introductory statement: "We can construct, however, the hypothesis that chronic emotional tension associated with anxiety, such as has been observed, may be related to impairment of the blood flow through the kidneys. In the presence of pre-existing renal changes, this conceivably results in an elevation of the systemic blood pressure."

In support of their thesis they present detailed personality studies in twenty-four hypertensive individuals. The outstanding characteristic in this group was early sense of insecurity associated with disturbance in interpersonal relationships which dogged them throughout life.

As seasoned investigators the authors are not given to overstatement or unwarranted claims and specifically state that their investigation is a clinical study planned to serve as a contribution to the nosology and development of hypertension, not to its etiology. That they have attempted, insofar as possible, to apply proper investigative procedure, is inherent in their short consideration of the desirability of controls, although they conclude that, in the nature of their material, controls are irrelevant and their existence implicit.

It is to be anticipated that the concepts expressed in this study will invite critical appraisal. The attitude taken by the authors will, perhaps, be more readily acceptable to the psychiatrist who is accustomed to dealing with subjective data, than to the clinician and

physiologist who have been conditioned to sole reliance on objective data. It is obvious that fruitful pursuit of studies of this nature necessarily requires judicious blending of both points of view as exemplified by this monograph.

With no intent to deny the thesis in its entirety and with the knowledge that the authors are quite aware of the need for further clarification, several exceptions must be taken.

One might take exception to the stand that controls are irrelevant to this study, on the grounds that since similar disturbance in personality and hypertension do exist independently, and in view of the frequency of both conditions, their coexistence may be fortuitous. Further exception may be taken to their thesis in view of their critical dependence on a chain of events involving chronic anxiety, renal vasoconstriction, disturbance of renal hemodynamics, elaboration of a renal humoral pressor substance, generalized vasoconstriction and hypertension, at a time when a large body of objective evidence has been accumulated indicating dissimilarity between experimental renal hypertension and human essential hypertension, and when much available objective evidence does not favor the view that the kidneys play a significant rôle in the genesis of human essential hypertension. Even admitting the wisdom of implicating the kidneys in the chain of events leading to hypertension, it is not clear that support for this hypothesis can be derived from Homer Smith's observation that renal blood is greatly reduced during states of *acute* anxiety, since collateral studies by Smith and his associates deny implication of the kidneys in the genesis of hypertension, and more particularly since, as the authors state, it has not been demonstrated that *chronic* states of anxiety and tension, as described in their patients, are accompanied by increased renal vasoconstriction. This is not meant to deny the possibility that such might be the case, but does point acutely to the "serious need of more clinical studies to trace the sequence of events in both spheres (psyche and soma) and of more experimental studies relative to the physiological and psychological components to clarify the problems of pathogenesis."

However the authors are fully aware of the tentative nature of their conclusions. They have added to the knowledge of the subject of essential hypertensions merely another clinical observation. They make it clear that their observation is applicable to only a fraction, but nevertheless a uniquely identifiable group of hypertensive individuals. Whether or not each link in the chain of events they have forged will endure after further study is of less importance than the fact that they have introduced a new technic, or preferably re-emphasized an old one, in the examination of a problem, the solution of which is of first importance.

This monograph was obviously written by clinicians whose special interest is the hypertensive diseases, and psychiatrists who, in spite of the necessarily subjective nature of the observations, have adhered so far as possible to the rigid requirements of objective investigation.

It must be noted that this study was not intended to investigate a causal relationship between disorders of personality and the circulatory alteration leading to hypertension, and the authors specifically state that such a conclusion is not possible from their data. In fact they express the opinion that hypertension may be the somatic expression and not the consequence of chronic anxiety and further that both may actually be different aspects of the same fundamental pathological process.

In view of this, the study involves no implications in regard to psychotherapy, directed at the cause of hypertensive disease.

This monograph should be read widely for its excellent discussion of some aspects of hypertension, and more particularly for its thoughtful presentation of a stimulating point of view.

WILLIAM GOLDRING

PAGE, IRVINE H., AND CORCORAN, ARTHUR C.: *Arterial Hypertension: Its Diagnosis and Treatment.* Chicago, Year Book Publishers, Inc., 1945, 352 pp. $3.75.

Although this is the work of two foremost investigators of the physiological aspects of hypertension, it is written from the psychosomatic point of view and as such represents an excellent effort to incorporate what is known about the emotional aspects of hypertension into a standard presentation of the most recent knowledge derived from physiological studies. Although the effort is commendatory it suffers for one reason, because our information about the personality of hypertensive patients is not on a par with recent additions to our knowledge of the physiological aspects of hypertension. Therefore, it is unfortunate that in a book, which is intended to be a practical treatise, the information regarding the psychopathology and psychotherapy of hypertension is not very helpful. The section on psychotherapy comprises 22 out of a total of 352 pages. Here the authors call attention to some of the well known facts regarding the superficial aspects of the relation of the emotions to hypertension and then state: "Such observations, however thoroughly documented, merely establish mental disturbance as coordinate cause; they do not suggest that it can be a

primary cause of the whole disease. To establish it as a primary cause, it must be shown (1) that hypertension can arise *de novo* as a sequence of a characteristic mental pattern or (2) that the disease as act and potentiality can be abolished by appropriate psychotherapy."

After reviewing some of the evidence regarding psychogenesis they suggest "that a process primarily mental may, presumably in cooperation with unknown neurohumoral factors, result in essential hypertension and that this mingling mechanism acts in an uncertain but large proportion of those who suffer from the disease." They continue, "Once the disease is established, it is apparent that the continuance of the coordinate or subordinate casual mental stress can only speed the onset of physical disability while, in the interval, it accounts for much of the misery the patient feels. The physician's problem is more onerous than strict organicism would suggest. He must recognize the personality patterns which may lead to hypertension and, by modifying and protecting them, attempt its prevention. In established cases he must guard against the temptation to deal only with the solid, entrancing, satisfying details of physical measurements which gratify his personal interest. Rather, when psychologic factors seem significant, he must give of time and ungrudging emotional energy as a firm, directing guide." This is truly the psychosomatic approach to the study and management of hypertension.

An excellent observation regarding the physician who looks on psychosomatic medicine with suspicion is "that he may find that some of its methods and proposals, although more set to rules, are those which he uses increasingly as his experience broadens in practice." The authors stress the importance of the patient-physician relationship but perhaps over-emphasize the bearing and appearance of the physician. While the practitioner will be disappointed by the absence of definite instructions regarding psychotherapy he will benefit by the general approach closely integrated with the structural and physiological aspects of the disease.

In a section devoted to cardiac neurosis the authors state, "The early symptoms of hypertension have the general pattern of diffused anxiety and are conditioned more by the personality of the patient than by the nature of severity of his disease." Much of value to the general physician will be found in this chapter.

The remaining chapters of the book deal with the most recent structural and physiological studies on hypertension. Their own studies, which have been outstanding, as well as those of other investigators, are presented in readable fashion so as to be most helpful to the internist and general practitioner.

EDWARD WEISS

CANNON, WALTER B.: *The Way of an Investigator.* New York, W. W. Norton & Co., 1945, 229 pp. $3.00.

Dr. Cannon, in the preface to his autobiographical "The Way of an Investigator," speaks of his several "me's" from which he had to choose in his volume. The reviewer must make a comparable choice in dealing with the resulting book. For there is in it much personal history, much sage advice, much mellow wisdom, much scientific gossip and information. Readers of Psychosomatic Medicine, for example, surely will be interested in the story, even though sketched in almost incidentally, of the origin and development of Cannon's concern with the play of emotional states on bodily functions and of the mechanisms involved; a concern which resulted in findings basic and provocative to many recent advances in psychosomatics. But, at a wider horizon, they and others will enjoy Cannon's simple summary of his experience as a scientist.

The slender book is not profound, nor is it so intended. It is not at all a scientific treatise, although much physiological lore has crept in. It is not a tract or sermon, yet the essential goodness of the man beneath the scientist is everywhere in evidence. It is not witty or scintillating, but passages of eloquence are not wanting. The book is a quiet sincere effort, by a man who has learned some things of general worth, to pass them on to others who might enjoy or profit from knowing them. The young investigator is told the errors to anticipate in his research and how to try to avoid them. The research director is made privy to Cannon's successful rules in guiding students and younger colleagues. The groping student, considering a career in science, is offered criteria against which to check his capacities and his expectations. And the interested layman is given some understanding of what happens behind the doors of scientific laboratories and in the minds of scientific investigators.

The chapter on World War I experiences is as vivid and heart-rending as the expert reports on World War II. The final chapter on ageing and retirement is touching without being sentimental. One on the duties of the scientist to serve in his special capacities also as a citizen, a responsibility Cannon himself fully accepted, should be read by many who remain chained to their private scholarship or research. In other places, Cannon courageously states the importance of teleology to the biologist, as a tool not an end, though such talk is suspect among his fellows; just as he courageously espoused the cause of the Spanish Loyalists when this was suspect politically, questioned dogmatic religion when this was suspect in respectable circles, or applied biological principles to sociological problems when this was and is suspect by many who

study human affairs. As already said, Dr. Cannon is a *good* man.

I am priviledged to know the author and perhaps read his personality into his writings; but I believe this book is truly the man who wrote it. Between the lines, almost more than in them, appear his solid virtues and his lesser limitations. His love of science matching his intense love of family, his high standards and firm self-discipline in serving them, his basic decency and selflessness, all these are revealed to the reader. Yes, "The Way of an Investigator" stamps its author as a fine man, perhaps even a great one as well.

RALPH W. GERARD

OLMSTEAD, J. M. D.: *François Magendie*. With a preface by John F. Fulton. New York, Schuman's, 1944, 262 pp. $5.00.

Professor Olmstead's book acquaints us with a fascinating figure, a Titan of medicine and science. Born in 1783 and dying in the reign of the second Napoleon, François Magendie lived at the very center of Parisian medicine, which was in those days the very center of medicine itself. Laplace, Cuvier, Lamarck, Flourens were among his intimates, Bichat was his teacher, Pelletier a collaborator, and Claude Bernard his student and assistant. Socially affable and generous, he was in scientific matters ruthless, fanatic, and contentious, but of an unimpeachable integrity. Although his colleagues suffered from his rudeness, his temper outbursts, and in one instance from a threat of physical violence, they regarded him as the greatest physiologist of his time. He made basic discoveries: not only the well-known foramen that bears his name, but (rather than Bell, it seems) the true functions of the spinal nerve roots, and the reflex nature of vomiting. He was the first to note sugar in the blood of normal persons, and to produce decerebrate rigidity in the cat. He had no scruples about experimenting on patients; he inserted a needle into a man's eye to prove that the retina had no general sensibility. His vivisections (without anesthesia of course) caused him to be called a monster in the press and on the floor of the House of Commons, although his sadism seems to be a matter of opinion.

Magendie was in the thick of the controversies of his day. His teacher, Bichat, was a vitalist. He held that living matter did not simply obey the laws that applied to dead matter; it was supposed to display irregularities of function not explainable by physics and chemistry alone. From this point of view experimental work had little purpose, an opinion widely held in medical circles. Function was to be inferred purely from structure, and these so-called *vitalists*, in apparent paradox with their name, expected to get their physiological information from dead bodies only. Sir Charles Bell, Magendie's opposite in a long wrangle for priority, objected to vivisection on religious grounds. He was a pure "anatomist"; while Magendie considered himself a mechanist and a physiologist. Whereas Bichat had performed an unbelievable number of autopsies, Magendie was hardly interested in anything not alive. His one concession seems to appear in a quotation: *"Je m'applaudis,"* he writes of a certain patient, *"dans l'intérêt de cette femme, de lui avoir rendu la santé, mais dans l'intérêt de la science, il est à regretter d'être privé des renseignements qu'aurait fournis l'examen anatomique des partis."*

In Magendie's day no one was a specialist as we know this term now. Magendie apparently made no distinction between cats and dogs and patients. Because of an experience with a dog, he drained the blood from a hydrophobic patient and injected warm water into the bloodstream. The patient's convulsions ceased for the nine days that he survived. Therapy had to be entirely "rational" as we should say today; and he made himself thoroughly unpopular by scoffing at the conventional treatment of his colleagues. Despite the fact that he was interested in the nervous system, indeed almost claimed it as his monopoly, he seems to have worked widely, following no guiding star, leaving tag ends of unexplained and inconsistent experiments, many of which Claude Bernard and others later straightened out. If one were to guess at a psychological formula for his choice of research, one might say that he seemed intent on knowing what could be done to an animal short of killing.

Magendie, the opponent of "vitalism" who would work with living things only, in his old age consistently enough spoke against the use of ether for surgical operations. For this he gave two reasons: embarrassed but with self-disciplined frankness, he stated that surgeons might be tempted to have sexual relations with their anesthetized female patients; and that such surgeons reduced the patient "to the state of a cadaver which one can cut at will without causing suffering."! Apparently Magendie's necrophilic fantasies, which appeared so naively or so compulsively in his old age, had played a rôle in his youth, and, in reaction against them he had turned from dissecting the dead to dissecting the living. There is a suggestion that this reaction took place when he abjured the "vitalism" of his great teacher, Bichat—the "volte face" to which Dr. Olmstead devotes a chapter—Bichat for his part having spent practically his whole life in the autopsy room.

Such leads are to be obtained, and others too, by a psychosomatically oriented reader of Dr. Olmstead's book. Indeed the reader cannot afford to ignore the controversies, the resistances, the prejudices and the

thoughts that were manifest in this revolutionary period of science and medicine. History, as Dr. Olmstead handles it, distinctly does *not* "teach that history teaches nothing"; it teaches—and very agreeably.

BERTRAM D. LEWIN

DEATSCH, HELENE: *The Psychology of Women.* Vols. I and II. New York, Grune & Stratton, 1944, 1945, Vol. I, 386 pp., Vol. II, 487 pp. $4.50, $5.00.

These books represent a pioneer attempt to fulfil "woman's desire to solve the riddle of her own ego." The desire is supplemented by the author's stated need to restate, to reassert, to correct or abandon the views which were first expounded in her book "Psychoanalysis of the Sexual Functions in Women" (1925), and which have or have not stood the test of later investigations. The books will have a wide audience—though women may not find their prototypes in Dr. Deutsch's types, they will find some moment, some experience or some attitude reflected in the descriptive elaborations of the types.

The task which the author has set herself is a difficult one. It has been over-simplified into a typology which is derived from a basic conflict between sexuality and eroticism on the one hand and motherhood on the other. This over-simplification is incompatible with the depth and breadth of the scope of problems involved—problems related to cultural anthropology and to psychosomatics as well as to psychology. The expositions are purely descriptive or phenomenological, while the theoretical frame-of-reference from which they evolve is never clearly defined. The reviewer finds it difficult to follow the presentation of aims, formulations and procedures and thus to give an adequate synopsis or paraphrase of the contents of the two volumes.

The stated "purpose is to explain . . . psychoanalytically . . . the normal psychic life of women and their normal conflicts . . . in our society." The evidences of psychoanalysis, however, lack "objectivity," which, paradoxically, is at once essentially a masculine trait and a scientific method of investigation. But since, according to the author, "the ultimate goal of all research is not objectivity but truth," . . . "woman's desire to solve the riddle of her own ego, her introspective contemplation of her own psyche, her capacity for identification with other women, are positive factors that can abundantly compensate for a feminine observer's lesser degree of objectivity." Accordingly, for the principles, methods and data of psychoanalysis are substituted: 1) personal observations; 2) "case . . . histories . . . recorded by physicians and social workers"; and 3) "creative literature less objective than clinical observations but all the more true because more inspired."

The abundance of material—rather than its complexities—dictates an attenuation of shifting, often contradictory and paradoxical, themes into two expansive volumes. The attenuation is justified by postulating "the fundamental duality of womanhood." The duality asserts itself for the first time with the onset of menstruation and reasserts itself with the concatenation of events involved in motherhood—it is thus not a "dualism" between two aspects of the same phenomenon, between the conscious and the unconscious, for example, but between two temporally distinct experiences or events. It is manifested in a "duality of experiencing, in conflicts between sexuality-and-eroticism and motherhood and between motherhood and motherliness, and in the individual-species, life-death, and self-preservation-reproduction polarities." Each phase of the duality has its own "core"—"the feminine core" and "the motherhood core"—although "the central problem of femininity itself is motherhood." The dualism cannot be merged into a monism, because "even when they (the conflicts) are solved realistically, without opposition of doubts or counterwishes, the solution is not necessarily successful." The conflicts are never precisely delineated; the author's stated reluctance to probing into psychodynamics and thus into the dynamic interplay between psychological, cultural, and somatic processes precludes consideration of the psychoanalytic principles which would illuminate the nature and genesis of the conflicts. Likewise, the criteria of a realistic, yet not necessarily successful solution are not stated. The exposition never goes beyond the statements-of-facts level. The author thus introduces the motif of valuations which, in turn, are supported by another valuation, viz., that the delineations in literature are more convincing than "clinical and statistical studies." The author's circumvention of the use of psychoanalytic principles and of evidences empirically derived from clinical psychoanalytic experience extends itself to the analysis of literature; and it is impossible to ascertain from the fragmentary, descriptive paraphrases the criteria of unsuccess and realism (and vice versa) in the resolution of conflicts.

The facades of the dualism may change, but the cores remain unchanged throughout all history and in all cultures. The rôle of psychobiological-cultural determination is summarily dismissed with statements to the effect that the basic conflict and the basic femininity are biologically inherent, yet psychologically self-operating. The bewildered reader is further side-tracked by observations and illustrations from mythology, literature and case histories to the effect that the dualism and the cores are impervious and impregnable—they are threatened only by "intellectualization" and/or man's psychology.

Volume I is devoted to "the individual development and personality of women"; Volume II to "her rôle as servant of the species."

The exposition in Volume I starts with "the young girl's psychologic development into womanhood." This process is ushered in at prepuberty, between 10 and 12 years of age, by "a thrust of activity." This thrust is engendered by the young girl's anticipated fear of complete surrender of her ego to the biologically intractable forces of passivity within herself; it is immediately aimed at achieving emancipation from emotional dependence upon the mother. The activity is manifested in aggressive curiosity and open secrecy about matters physiological, in well-intentioned meddling in the affairs of elders, and in the "acting out" of fantasies and identifications, as well as in "tomboyishness." The aggressive curiosity, etc., form the bond which unites two girls in friendship and later in mutual idealization of a third. The author stresses the homosexual aspect of the two-girl friendships, and relates both the homosexuality and tomboyishness to bisexuality. But only phenomenologically, and not dynamically and genetically: the rôles of unconscious motivation and immediate acculturation and the interplay between these and constitutional factors are slighted; thus the sequence of genesis and developing, behavioural manifestations appears to be paradoxically distorted—the causes seem to be located in the future, whereas the activity is directed towards the past.

Once ushered in, the psychological development from young girlhood into womanhood is physiologically complete with the onset of menstruation. The author, of course, makes reservations with regard to this categorical statement. The purely descriptive account, however, does not provide the reader with a frame-of-reference which will enable him to grasp the psychosomatic connotations in the appropriate perspective. According to the author, the foundations of the feminine personality are laid during the years from prepuberty into adolescence and "the feminine core" has been definitely formed by the time of the termination of this process of development.

The "three essential traits of femininity" are passivity, masochism, and narcissism. Passivity and masochism are biologically inherent mechanisms, functions, or elements. However, they may be inordinately intensified by the onslaught of physiologically discrete events —at first by menstruation; later by the concatenation of physiological events involved in motherhood. "Passive-masochistic decline" is prevented through the intervention of the ego in the form of narcissism and narcissistic safeguards which ally with either passivity or masochism. Narcissism is reinforced by "a constitutional inhibition of sexuality" which, in turn, is reinforced by feminine masochism; together they foster the "spiritualization" of the "sexual instinct." From this triad emerge "the specific feminine qualities"—1) greater proneness to identification, 2) stronger fantasy, 3) subjectivity, 4) inner perception, and 5) intuition, or "the ability to understand one's own feelings and psychologic relations and, by analogy, those of others."

The triad and the pentad have their locus in "the emotional harbingers of woman's reproductive functions, which exist in her before real motherhood begins" and thus is laid the scene of the basic conflict of femininity and the basic feminine types. Again, the reviewer feels, the cause is projected into an uncertain future, since the author does not attempt a systematic account and empirical demonstration of the rôles of the unconscious, of fantasy, or of family constellation—or of the dynamics of the interaction between psychological and somatic processes.

Together, the triad, the pentad, and "the emotional harbingers" structure two feminine-erotic types. These are easily recognizable, closely interrelated, and *"can be derived from the interplay between narcissism and masochism."* They have their prototypes in Princess Helene and Vera in Tolstoy's "War and Peace." There is still a *third* feminine type, a borderline type—the feminine-active-moral woman. It "contains an admixture of active drives generally ascribed to masculinity; its masochism has not the relatively pure form of a pleasure function":—"it is accompanied by considerable elements of 'moral' masochism (a masculine trait); and is manifested in a stronger tendency to conscious and unconscious guilt feelings." "An independently operative active tendency in the ego" is postulated to take care of these complications. This type prevails in a Calvinistic milieu. The "emotional harbingers," "motherhood" and "motherliness" (compounded of "maternal instinct" and "maternal love"), and the polarities stemming from the "duality of experiencing" bring about permutations and combinations of the feminine types and thus there are erotic-motherly, feminine motherly, active motherly and other types.

The typology is further extended to include those women who seemingly exhibit non-feminine modes of behaviour. The analysis of this "non-feminine aspect of femininity" leads to the formulation of two more types—the "active" woman (masculinity complex) and the homosexual. The author is especially interested in locating "the feminine core beneath the surface even where psychologic or sexual behaviour seems to contradict it or when social pressure compels women to assume 'masculine' functions." This she locates through an analysis of Carmen, whose "cruel sadism" isn't sadism at all, but an "archfeminine, tragically whipped-up masochism." Into the descriptive elaboration of this

analysis, the author introduces the polarity of sadism and masochism and a restatement of her views on penis-envy and the masculinity complex, as well as oral dependence and positive attachment to the mother. These issues are belabored in a circulatory fashion. The sadism-masochism polarity notwithstanding, the concepts of ambivalence, rejections and frustrations, and guilt do not enter into the discussion of any of the issues involved. Even the possibility that hostility and aggression may be operative in psychologic functioning is regarded as untenable. The author's portrayal of the "non-feminine aspects of femininity"—more so than that of the feminine types—illustrates incisively the impasse that is inevitably encountered by the investigator who attempts a psychoanalytic interpretation and yet rejects psychoanalytic principles and methodology.

With all the elements secure in the crucible, the author by-passes courtship, men, sibling rivalry, etc., and in Volume II traces the careers of the various types through physiological and psychological experiences that are not dynamically related one to the other or dynamically interrelated—from through motherhood, the mother-child relation (including stepmother, adoptive mother, and unmarried mother), and into the epilogue of the climacterium. There is a further multiplication of elements and the like, including malicious frigidity, benevolent frigidity, and malicious orgasm and also a further multiplication of types or the like to include "wicked" mothers, grandmothers, and stepmothers and motherly prostitutes.

Any study by Dr. Deutsch should be informative, thought-provoking, and scientifically competent. Almost any review of psychoanalytic literature will reveal that her contributions to the understanding of the neuroses have been cogent and her clinical illustrations always incisive. However, in the instance of these two volumes, the reader is apt to be disappointed in proportion to his anticipations. For the author, as can be gauged from the foregoing skeletal paraphrase, has chosen to disregard the evidences and methods of psychoanalysis and, with her definition of science, has introduced the theme of ethics and values which is alien to the scientific spirit and methodology of psychoanalysis. Further, the author has gone too far afield with this orientation into the as yet incompletely explored cultural and psychosomatic interrelations and categorically dismissed their importance in all-or-none terms. The premises on which she argues types, polarities, dualities, etc.; the constancy of the "cores" in all cultures and the epiphenomenonality of somatic processes are never stated or defined. A close examination of the two volumes will reveal that the types, etc., have their roots in oblique elaborations of certain psychoanalytic principles and observations and that failure to consider psychodynamics leads to a confusion of "facades" with "cores" (and vice versa) and to an equation of biology with anatomy, instincts, and even histopathology. Psychodynamics and genetics are seemingly resolved into a "which came first—the hen or the egg—" controversy and the issue is decided in favor of psychological factors. Not unsurprisingly, Dr. Deutsch is thus most defensive in the field where she should be most secure—since psychoanalytic research and clinical experience have been extremely cautious in making categorical statements about differentiation within the neuroses and psychoses and between the neuroses and psychoses, let alone between the sexes and within each sex. Not unsurprisingly, too, she is most confident in making assertions about cultural and somatic functioning—about the findings in two fields which, at the present moment of development in relation to psychoanalysis, call for caution and specialized research. The result is that the author never really comes to grips with the task she herself has set and the positive contributions are practically obscured by the unduly personal note which prevails.

EVA RUTH BALKEN

HARROWER, M. R., AND STEINER, M. E.: *Plates and Manual for Psychodiagnostic Inkblots. (A Series Parallel to the Rorschach Blots.)* New York, Grune & Stratton, 1945, 10 plates, 112 pp. Plates, $4.50, Manual, $2.00.

The authors have worked with a series of ten inkblots which look superficially different from the standard inkblots used by Rorschach. Actually the construction of the new cards follows carefully the course of systematic variations of gestalt and surface qualities underlying the original series. Statistical proof is given that the same types of scores are obtained with either series. This achievement should make the Harrower Blots most welcome to those who wish to objectivate changes of personality in subjects under prolonged clinical observation, because the new set allows for repeat performances which would not be affected by the influences of memory and past experience. The manual gives detailed statistical information on the responses obtained from 225 normal subjects and from 160 institutionalized patients. This makes it easy to use the new cards successfully without acquiring personal experience.

The only difference between the old and the new series is found in the fact that the new series makes it easier to give form-color responses. This may be of practical value. Furthermore it raises again the theoretical question whether the original set is not unnecessarily limited in its usefulness by the personal bias of Rorschach himself. (See G. A. Roemer: Vom Ror-

schachtest zum Symboltest. Zentralblatt fuer Psychotherapie **10**:310, 1937/38.)

Aside from its main purpose the manual is valuable because it includes the results of a study of clerical workers and of engineers. It appears that different personality traits are required for success in each of the two groups. This reviewer feels that the reliability of technical aptitude tests could be greatly improved if used jointly with the projective inkblot technique.

GOTTHARD BOOTH

CANTOR, NATHANIEL: *Employee Counseling, A New Viewpoint in Industrial Psychology.* New York, McGraw-Hill, 1945, 175 pp. $2.00.

Nathaniel Cantor in his timely book, *Employee Counseling, A New Viewpoint in Industrial Psychology,* has presented a study of the counseling movement in industry and has set forth the psychological theory from which the most successful counseling derives. He has outlined the qualifications and procedures essential to the employer counselor if he is to reach, understand and help the real emotional causes of his clients' dissatisfaction.

Hitherto in its emphasis upon the high efficiency of its technological development, management has ignored, or rather has not understood the relative lack of efficiency of its workers. There has been little recognition that the activities of industry are social as well as economic, that employee dissatisfaction and low morale are due in part to the fact that their social needs are not satisfied.

In 1927, a program of research was begun by the Hawthorne plant of the Western Electric Company, as a study to discover what physical factors in the working environment of employees accounted for their morale and efficiency. The effects on the workers' productivity of illumination, temperature, working hours, rest periods, special lunches, physical examinations, were studied. After several years of statistical correlation, not one significant or valid conclusion could be drawn about increased productivity and change in physical environment. After 18 months, the experimentors removed all the favorable physical factors, but as each change was made, the workers were sympathetically consulted about their views and feelings, and helped to express themselves. The result was that their output maintained its former level. The workers had received approval, prestige, recognition; their attitudes improved, they felt happier and worked better. This observation was a great surprise to the experimentors, who drew the conclusion that the employees' productivity depends in large part upon their feelings about their jobs, fellow workers, supervisors, and the meaning of the whole work situation to them.

The decision was made to approach the problem of employee morale by introducing the interviewing method. This was a new way of handling personal relations in industry, the beginnings of a new approach to industrial psychology.

The employee consultants' function is to help the employee help himself to adjust to a psychological problem that interferes with his performing an efficient job, to help him get rid of or lessen the intensity of the emotional burden, and so free him to do a better job. This is the counselors sole objective and he does not touch problems directly concerned with wages, hours, conditions of work, or other problems.

ALICE KISSEL

ROBERTS, KATHERINE E., AND FLEMING, VIRGINIA: *Persistence and Change in Personality Patterns.* Monographs of the Society for Research in Child Development. Vol. VIII, Serial No. 36, No. 3. Washington, National Research Council, 1942, 206 pp. $1.50.

This monograph attempts to answer the question: "Are human traits fixed, or are they modified by life experiences?" The data consist of the life-histories of 25 women interviewed in the Advisory Service for College Women of the Merrill-Palmer School in Detroit, Michigan. Part I presents three sample case-histories (original "average length 90,608 words") in condensed novelette form but, possibly because the authors themselves did not do the interviewing, the published anamneses show little insight into the nuances of individual and social development in their subjects. Substituted are the usual clichés about "feelings of inferiority," "difficult relationships," "poor emotional outlets" and other phrases used as secondary evaluations of the original biographic material. From such data, nevertheless, various "traits" such as *shyness* and *strong ego drive* are abstracted, coded, tabulated and analyzed for the factor of *persistence,* and its variations from case to case. Despite the Methodologic tenuousness of such procedures, the authors then present tables to show that traits such as *seeks help when needed* rate only 11% persistent, whereas *has a few friends in whom she confides* is 100% constant, presumably up to the time the subject confided in the interviewer. The authors conclude that "there seems to be a nuclear personality pattern for every individual . . . around (which) nucleus other traits and attitudes shift as life proceeds" but that "even the nuclear pattern may change when conditions are changed radically." To answer the subsidiary question, "Do homes matter?" the authors classify their subjects into those from *"happy"* (5) *"unhappy"* (4) and *"medium"* homes (16) according to criteria as *gets along with parents* vs.

thinks mother considers doing things for children too much trouble. The authors conclude, again somewhat predictably, that homes matter.

Similar revelations by tabular divination are then related to chapter headings such as "Is Personality Related to Marital Happiness?", "Personality and Religious Values" and "Social Adjustment and Personality." There is a 56 page appendix of tabular data, without specific or implied qualifications to the effect that these "data" really represent the authors' abstracted opinions of the interviews' recorded opinions of the subjects' expressed opinions of themselves. Characteristic also is the inclusion of several elementary text-books and three dictionaries in the bibliography of 29 titles, with almost no reference to the rich literature of psychoanalytic and clinical studies in the field.

The main defects of this monograph are those of the traditional academic approach to "personality": methodologic devotions to questionnaire "tests," the tabulation of "traits" and other vague generalities, and the statistical derivation of the same presuppositions and pedantries that were originally injected into the material. Despite the undoubted sincerity of its composition, therefore, this monograph is recommended only as a documentary case-study of a rapidly passing preoccupation with the trite and the sterile in the study of human behavior.

JULES MASSERMAN

BOOK NOTES

GRINKER, ROY R.: *Neurology.* 3rd Ed. Springfield, C. C. Thomas, 1945, 1136 pp. $7.00.

The third edition of this well known work has been revised to include some of the more recent neurophysiological research, not only as an addition to the basic sciences section, but in clinical considerations as well. The portion on brain tumors has been rewritten by the neuro-surgeon, Paul Bucy, and many illustrations have been added to further clarify the text.

The authentic and critical reviews of many of the neurologists' working theories are of value to the critical reader, and the basic science section help to make the work a one volume encyclopedia of neurology for the advanced, as well as beginning, student in the field.

H. M. SEROTA

FORD, FRANK R.: *Diseases of the Nervous System in Infancy, Childhood and Adolescence.* 2nd Ed. Springfield, C. C. Thomas, 1944, 1094 pp. $12.50.

This book of 1094 pages with 2221 bibliographical references and an index of 49 pages was written with the intent of including all the neurological conditions which occur in childhood, not merely those which are peculiar to childhood. The author has tried to develop a classification based primarily upon etiology with due emphasis upon clinical features, rather than a purely anatomical classification. It is almost encyclopedic in breadth but may well serve as an excellent text book for neurologists and pediatricians.

The book is a treatise on organic neurology. The reviewer found himself in somewhat of a dilemma as to its psychosomatic implications. There are no pretensions as to the encompassing of psychiatric or psychologic aspects although passing mention is made to spastic constipation, cardiospasm, laryngospasm, bronchospasm and asthma and psychologically determined disorders simulating organic diseases of the nervous system. With the nervous system as the intermediary apparatus for psychosomatic reactions to what extent can one disregard psychiatric and psychologic considerations? One misses the feeling that after all infants, children and adolescents are human beings in whom there are diseases of the nervous system. In taking the history should not the child and the adolescent participate as well as the parent in telling his story even though it may be primarily of a neurologic disorder? Although the child neurologist and pediatrician will learn a great deal from this fact laden scholarly book, relevance to the person is always necessary.

JOSEPH J. MICHAELS

BROSTER, L. R.: *Endocrine Man: A Study in the Surgery of Sex.* New York, Grune and Stratton, 1944, 144 pp. $3.50.

The title is pretentiously misleading. One chapter, 25 pages long, is devoted to a classification of types of intersexuality, and it is here that the author, a British surgeon who has done 15 years' research on the adreno-genital syndrome, mentions that such-and-such an operation was performed on such-and-such a patient. For the rest, the author summarizes the biology of man, discoursing in polished, trite, and stilted phrases on instinct, heredity, evolution, the diencephalon, symbiosis and parasitism, the endocrine system (two chapters), and finally, of course, on the nature of man.

Since nothing is said that could not be found in a good physiology text, it is hard to understand why the publishers should have done our British colleague such a disservice as to bring out the work on this side of the Atlantic. It is to the author's credit that he had a competent psychiatrist undertake the psychological part of the adreno-genital study, this being reported elsewhere.

LOUIS PAUL

MEERLOO, A. M.: *Total War and the Human Mind.* New York, International Universities Press, Inc., 1945, 78 pp. $1.75.

Major A. M. Meerloo spent 2 years in German occupied Holland and lived to report about it. The morale and intellectual isolation motivated him to study his environment closely. As a physician he was an advisor to his community in times of extreme need and stress and this gave him an exceptional observation post. He studied, analyzed and described the reaction of the Dutch people to the German occupation and to the experience of Hitler's applied psychological war. He analyzed the elements in the human character which make for mass delusion of the German type and for the mass and individual courage of the Dutch type.

The book is written with great restraint and maturity and with true understanding of the democracy "within us," meaning democracy as a psychological attitude.

MARTIN GROTJAHN

STERN, EDITH M.: *The Attendant's Guide.* New York, The Commonwealth Fund, 1945, 104 pp. Single copy 50c.

This paper covered book, with a foreword by Dr. Samuel W. Hamilton, is readably written and provides a comprehensive guide for the attendant in a mental hospital. It is stated that all of the measures proposed for the care of patients have been tested by experience and proved workable. The book thus offers practical guidance while presenting a sympathetic and humane point of view toward mental illness. As attendants come to adopt such a point of view, the interest of their job will be considerably enhanced.

IRMA HEWLETT

To Foster Parents About Foster Children. Prepared by the New York City Committee on Mental Hygiene and the Bureau of Child Hygiene of the New York City Department of Health. New York, New York City Committee on Mental Hygiene, 1944. Single copies 25c.

These two pamphlets are addressed to two groups. The first is written for foster parents themselves; the second is for the nurses and social workers who are dealing with foster parents. The pamphlets are focused on the foster child's emotional needs, and give many concretely helpful suggestions on management.

IRMA HEWLETT

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BRAIN, W. RUSSELL, AND STRAUSS, E. B.: *Recent Advances in Neurology and Neuropsychiatry.* 5th Edition. Philadelphia, The Blakiston Co., 1945, 363 pp. $5.00.

BRENMAN, MARGARET, AND GILL, MERTON M.: *Hypnotherapy.* New York, Josiah Macy, Jr. Foundation, 1944, 85 pp.

DRAPER, GEORGE, DUPERTUIS, C. W., AND CAUGHEY, J. L., JR.: *Human Constitution in Clinical Medicine.* New York, Paul B. Hoeber, Inc., 1945, 273 pp. $4.00.

FLUGEL, J. G.: *Man, Morals and Society.* New York, International Universities Press, 1945, 328 pp. $4.50.

GRINKER, ROY R., AND SPIEGEL, JOHN P.: *Men Under Stress.* Philadelphia, The Blakiston Co., 1945, 484 pp. $5.00.

HEATH, CLARK W.: *What People Are; A Study of Normal Young Men.* Cambridge, Mass., Harvard University Press, 1945, 141 pp. $2.00.

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HOOTON, EARNEST: *Young Man, You Are Normal.* New York, G. P. Putnam, 1945.

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LOWRY, SAMUEL: *New Directions in Psychology; Toward Individual Happiness and Social Progress.* New York, Emerson Books, 1945, 182 pp. $3.00.

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SARGENT, W., AND SLATER, ELIOT: *An Introduction to Physical Methods of Treatment in Psychiatry.* Edinburgh, E. & S. Livingstone, Ltd., 1944.

SCHEINFELD, AMRAM: *Women and Men.* New York, Harcourt Brace & Co., 1944, 453 pp. $3.50.

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STRECKER, EDWARD A., AND APPEL, KENNETH E.: *Psychiatry in Modern Warfare.* New York, Macmillan, 1945, 96 pp. $1.50.

WEST, RANYARD: *Conscience and Society. A Study of the Psychological Prerequisites of Law and Order.* New York, Emerson Books, 1945. $3.00.

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